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MONTHLY INTERNATIONAL FEATURE ISSUE

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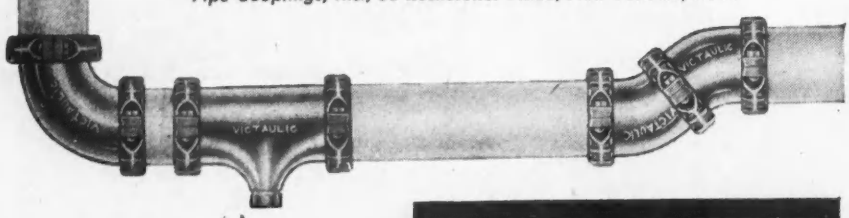

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Looking Ahead

WITH THE EDITOR

NEXT week THE OIL WEEKLY will present its ANNUAL YEARBOOK-FORECAST ISSUE to its subscribers. As you certainly have guessed from the boasting we have done in recent weeks, we proudly and confidently offer this issue as the finest piece of petroleum statistical work we, or others, have ever done.

Several reasons prompt us to make such claims. In the first place, it contains a much larger volume of valuable data on the industry's operations during 1946 and its prospects for 1947 than you can find elsewhere between any two covers. Secondly, great care has been exercised to make it a useable reference number, by presenting the material in a concise and readily found style.

In this number you will find the answer to: the trend of consumption of crude and its products, to crude production by states within the U. S. and countries outside the U. S., natural gas production, natural gasoline output, well completions and footage by states, forecast of 1947 drilling by states, stocks of crude and refined products, imports, exports, drilling and producing depth records by states, crude reserves, statistics on wildcats drilled, detailed data on productive wildcats of the year, production by individual U. S. fields—and a host of other subjects.

Equally important is the presentation of material in useable form. Not only will statistical tables show trends on every phase from 1918 to date together with a concise discussion, but every phase will be pictured on charts—charts designed so they can be quickly and easily read while accurately illustrating the trends.

Save your YEARBOOK-FORECAST number and you will find many uses for it during the next 12 months.

THE OIL WEEKLY, published every Monday. Entered as second class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879.

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PETROLEUM REFINER and The REFINERY CATALOG
for the refining-natural gasoline industry

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The OIL WEEKLY

ENGINEERING NEWS STATISTICS

R. L. DUDLEY, President, Publisher A. L. BURNS, General Manager

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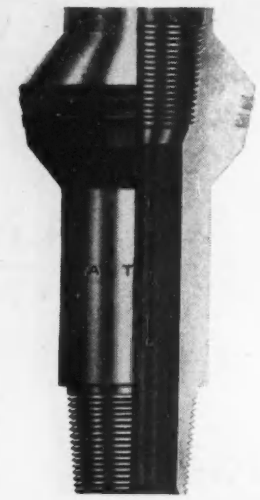

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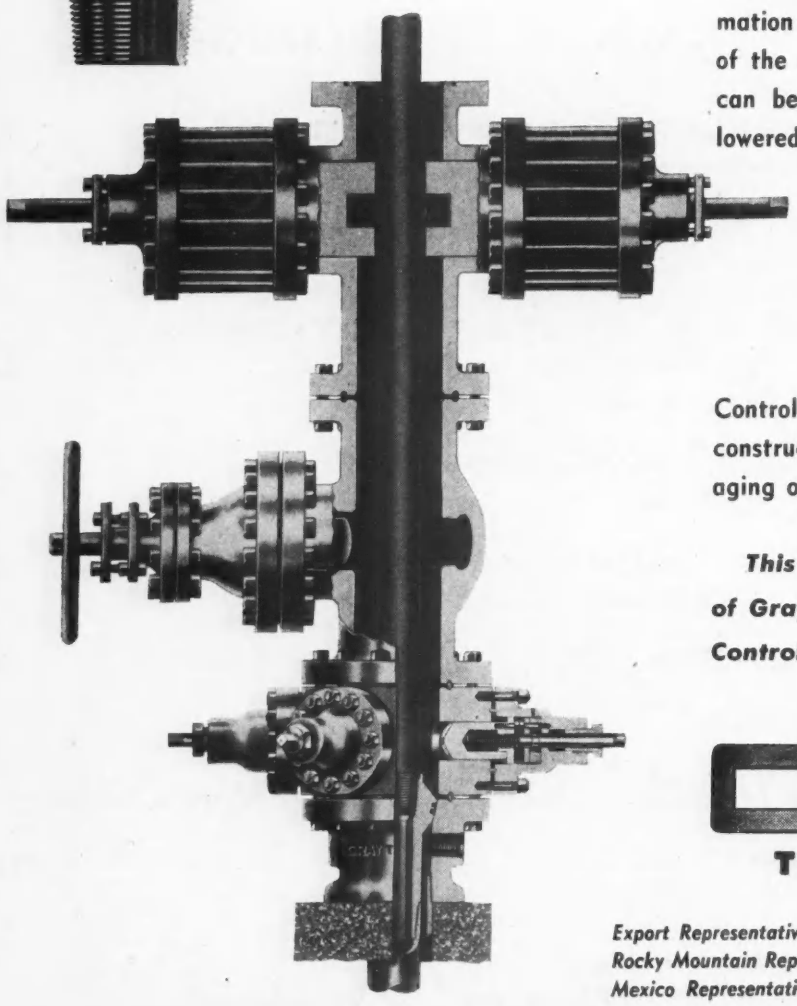

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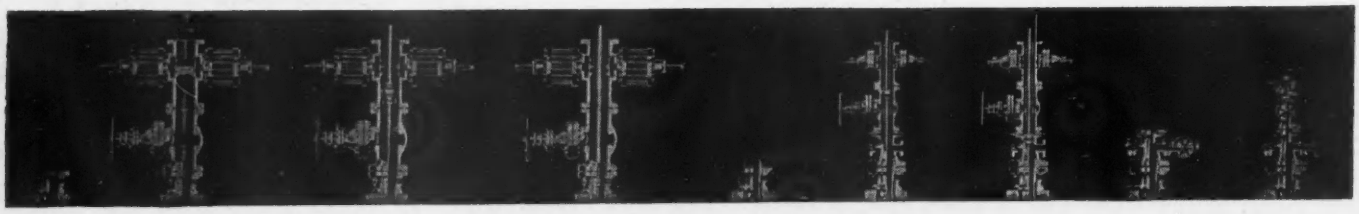

Casing Head Attached | Drilling | Running Casing | Casing Landed | Drilling Control Equipment Removed | Drilling-in and Running Tubing | Tubing Landed | Control Equipment Removed | Manifold Attached

THE CHANGING Panorama

Middle East Activities Mean Pipe Lines

PIPE line angles developing concurrently with the several tremendous deals involving oil in the Middle East furnish an interesting discussion by themselves. Outlets in those inaccessible areas are almost as important as reserves and the basis for negotiations currently going on whereby Standard Oil Company (New Jersey) and Socony-Vacuum Oil Company are to acquire a 40 percent interest in Arabian-American Oil Company likely will be how much oil can be delivered rather than reserves alone.

For instance, in Saudi Arabia the reserves already proved are estimated between 10 and 20 billion barrels. The part of the country now proved productive is covered by a concession running for 60 years from July 4, 1933. With present tidewater outlet unchanged, and with the proposed pipe line from Dammam to the Mediterranean Sea completed and operating at its estimated capacity of 300,000 barrels daily, Saudi Arabia would be producing roughly 500,000 barrels daily if a sustained market for that quantity of crude is established. At this rate between 8 and 8½ billion barrels could be produced during the unexpired term of the concession.

As an adjunct to the deal whereby Anglo-Iranian Oil Company is to sell over the next 20 years, one billion barrels of crude to New Jersey Standard another pipe line is proposed from the Abadan area to a Mediterranean port. This line would have initial capacity of 300,000 barrels daily.

Additional investment in Iraq is being made by Near East Development Company, owned by Jersey Standard and Socony-Vacuum, to defray proportionate cost of pipe line construction from Kirkuk, Iraq, to Haifa, scheduled to bring an additional 90,000 barrels daily from that area to tanker terminals. In prospect is possibility of still another increase in capacity from Kirkuk to Haifa or Tripoli.

This leaves Kuwait, one of the large reserves of the Persian Gulf area, as the only one without pipe line commitments, and has given rise to reports that a line is planned to the Mediterranean to handle oil from the Burghan field. Such a line is unlikely under present conditions. The Kuwait field is owned by Gulf Oil Corporation and Anglo-Iranian Oil Company, Ltd., and with a line definitely in prospect from Abadan, fairly near the Kuwait field, the capacity of the new line doubtless will be shared by Kuwait and Iran oil. Very little construction would be required to connect to the Abadan-Mediterranean line, and should the markets justify expenditures over and above the original $120 million cost of the line, additional stations would just about double the intended capacity.

With the proposed lines from Saudi Arabia, Iran, and Iraq furnishing an outlet for an additional 780,000 barrels daily over and above what is now being produced, and with a certain increase in tanker availability, it is unlikely that the operators of Kuwait would spend $120 million on a system when pipe line facilities are to be made available at Abadan. Anglo-Iranian spokesmen have indicated that the company would be willing to make necessary increases in its line's capacity upon assurance that the capacity would be used by Kuwait Oil Company.

☆ ☆ ☆

Collectivists have brought great zeal to their efforts. . . . We who cherish the established society, who recognize the horrors of the alternatives, have been ineffective by contrast. We have been too routine and matter-of-fact in a contest that demands a crusading spirit.

—WILLIAM K. JACKSON, President,
United States Chamber of Commerce.

Chairman Outlines Role of The NPC

"WE HAVE not been asked to surrender any freedom."

These are the words of Walter S. Hallanan, president of Plymouth Oil Company, Pittsburgh, in accepting the chairmanship of the National Petroleum Council.

"We are only asked to cooperate along lines that will aid in the elimination of governmental confusion and in counseling those who are charged with the responsibilities of national security," he continued.

"Those are requests that we should not deny. With the exercise of prudence and the adequate safeguards which surround the organization of the council, I am certain that we can integrate ourselves to a legitimate consideration of matters in which the government seeks our advice and cooperation, and at the same time strengthen the position of our industry in its relations with the public welfare. That will be our aim.

"In meeting the problems of peace we propose to continue the same teamwork which was so fruitful in time of war."

That's Hallanan's concept of the council's role. And the betting is that if ever there's pressure for deviation from the course, the chairman will speak right out and the industry itself can be quickly alerted.

Editorial Index to 1946 Issues Available Soon

The complete editorial index covering all issues of *THE OIL WEEKLY* published during the year 1946 is being prepared and, as soon as it has been printed, will be bound separately in convenient pamphlet form and will be sent without charge to every subscriber who requests a copy.

Requests should be addressed to the Circulation Department, Box 2608, Houston 1, Texas. Such requests may be mailed immediately although it will be some weeks before the index can be printed and sent out.

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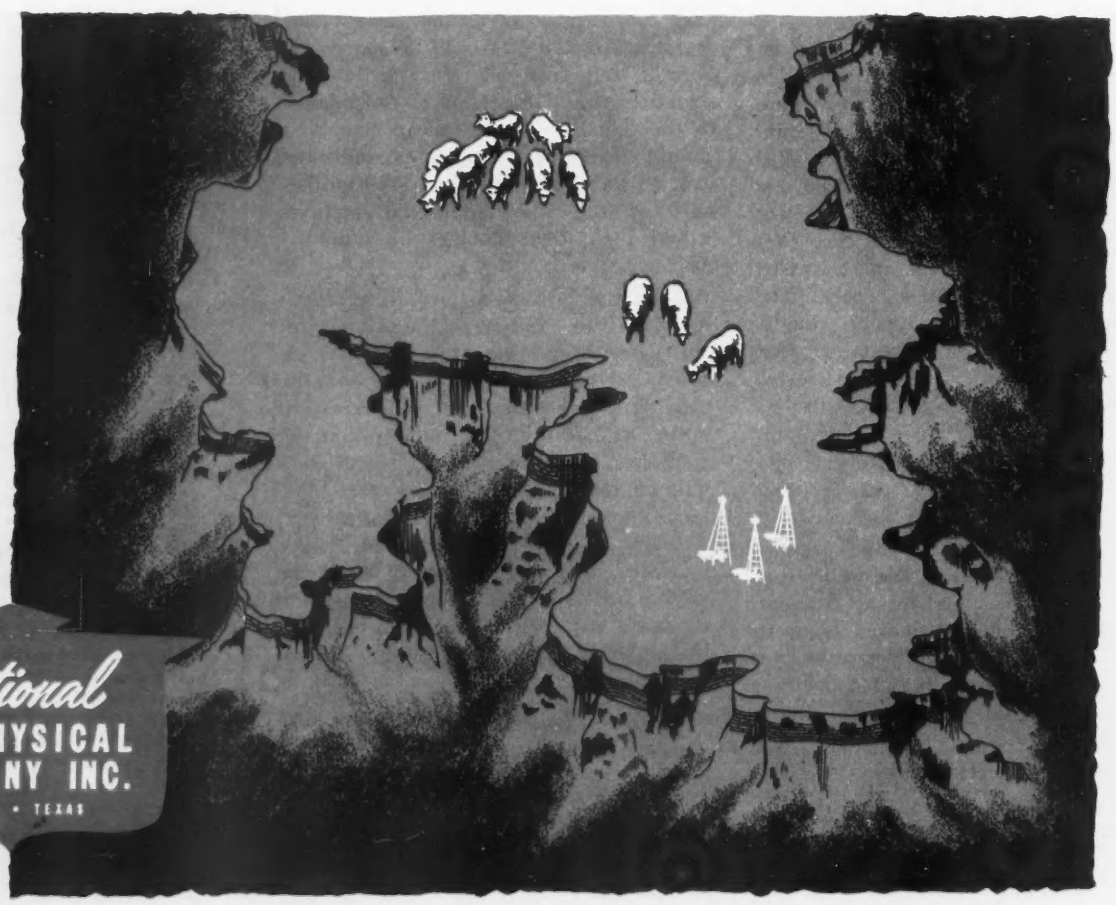

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THE WEEK'S NEWS

THE Special Petroleum Investigating Committee has made its report to the Senate, pointing to the need for maintaining domestic oil reserves and the promulgation of a sound foreign policy as regards oil. Story below.

Oil Tax Receipts Drop—Receipts from the three federal oil taxes dropped last year to $36 million under those of 1945, but all of the loss was incurred during the disturbed first half of the year and at its close tax collections were soaring to new heights, it is shown by Internal Revenue Bureau figures.

Friendly Treatment for OGD—Oil and Gas Division officials are confident that Congress will vote the full $463,900 asked for in the budget, following a hearing before a House Appropriations subcommittee described as even more friendly than they had anticipated. Page 12.

Oil Public Relations—Organization meetings of district public relations groups of the petroleum industry will be held within two weeks, API announces. Page 14.

ILO Meeting Opens Today—The first meeting of the newly-established petroleum committee of the International Labor Organization is convening in Los Angeles today with little likelihood that definite conclusions will be reached at this time. The greater part of the time will be taken up with matters of organization and an effort to agree on subjects to be studied. ILO report discusses world supply. Page 14.

Anglo-American Pact Soon—The State Department has recommended that the Senate Foreign Relations Committee schedule the Anglo-American Petroleum Agreement as item No. 3 on its calendar, and is hopeful that it may be brought up for consideration this month. Page 13.

Public Lands Leasing Rules—Regulations covering the making of unit agreements by operators on the public lands have been issued by the Interior Department in a single document for the first time since the unitization program started and a standard form of agreement has been prepared, the use of which, however, will not be made mandatory.

Salvage Gas, Complete Mapping—Secretary J. A. Krug in his annual report seeks to show the importance of adequate mapping of the country's resources and the need for salvaging flared gas. Page 12.

February Demand—Demand for domestic crude during February will remain at the January level of 4,640,000 barrels daily, it is estimated by the Bureau of Mines. Page 13.

Big Inch Delay—WAA officials are represented as prepared to call off the February 8 bids for the Big Inch pipe lines as soon as an indication is manifested of congressional determination to study the matter. A final decision whether the Senate will act on resolutions calling for suspension of the sale may be reached by the Senate Armed Service Committee today.

Increase of Domestic Reserves, Sound Foreign Policy Asked by Senate Group

The United States today is at a crossroads and must quickly decide whether to await "with hope" the discovery in this country of sufficient petroleum to insure military requirements of the future, in the meantime depending upon foreign oil and trusting that war will not cut off our imports, or take steps to guarantee a domestic oil supply adequate for all eventualities, the Senate Special Petroleum Committee declared January 31 in summing up the results of nearly three years' study.

Submitting his final report as the committee, of which he has been chairman since January, 1945, passed out of existence, Senator Joseph C. O'Mahoney declared that under the chairmanship of his predecessor, the late Senator Francis Maloney of Connecticut, it was responsible for killing the Ickes-sponsored proposal for construction of the Trans-Arabian pipe line and had thwarted plans of the Roosevelt administration to jam the Anglo - American petroleum agreement through as an executive agreement without reference to Congress.

On the basis of the committee's studies, embodied in a 70-page report submitted to the Senate, O'Mahoney declared, "the first principle of American petroleum policy should be to sustain our domestic supply of petroleum and to maintain the American system of competitive free enterprise at home and abroad. The second principle is to make human freedom the cornerstone of our policy, liberty and opportunity for people without discrimination or restraint, both within and beyond our borders.

To attain these ends, the committee made the following specific recommendations:

"1. Enact laws most conducive to stimulating additional exploration and development in U. S. Encourage conservation to prevent waste. Promote interstate compacts so that our reserves may be expanded and used in the public interest but guard against any danger of misusing conservation laws to restrain unduly any operator. Administer the public lands, not primarily as a source of governmental revenue, but for the purpose of stimulating private initiative in discovering and developing oil on the public domain.

"2. Utilize government facilities to promote research in manufacture of synthetic liquid fuels, but without permitting governmental competition with private industry. Enact legislation as necessary and proper to encourage secondary recovery from old fields.

"3. Encourage free competitive enterprise by tax reforms to restore incentives for risk of private capital in new ventures. Maintain the atmosphere in which competition may survive by enforcement of the antitrust laws. Adhere to the federal statute prohibiting shipments in interstate commerce of petroleum produced in violation of state law. Continue income-tax law provisions permitting deductions for depletion and intangible drilling costs.

"4. Require full disclosure to the appropriate government agency of principal terms, conditions, and obligations by which American companies undertake to carry on the petroleum industry abroad.

"5. Follow a foreign policy designed to promote full development of the petroleum resources of the whole world for the benefit of all peoples of the world; to secure adequate supplies of petroleum to all peoples; and to discourage artificial restraints and restrictions, both political and private, which deny full opportunity for the people of all lands to participate beneficially in the production and distribution of petroleum and petroleum products."

Although never clearly defined, the U. S. has always had an oil policy of sorts, based on the "open door" principle, and the industry under that policy and with a minimum of government impediments has been eminently successful, the report said, after outlining the basic facts brought out during the hearings.

"A petroleum program that has yielded these magnificent results would seem to require no radical change," it commented. "On the other hand, this country may not wisely conclude that the wells will never run dry, nor that the reserves which its explorers have discovered abroad will always be available. In this troubled world, which has not yet learned how to avoid war, the oil policy of this nation while at peace must nevertheless be governed by the inexorable demands of self-preservation.

"If the United States should become engaged in a war waged wholly or partly outside its boundaries, the availability of oil from American reserves near the foreign theatre of hostilities would be advantageous. To the extent that the war

were waged within or near the continental United States, the reserves within this country would be of paramount importance.

"It follows that nothing should be done to weaken the productive capacity of domestic reserves, and that every possible step should be taken both to increase these reserves and continuously to develop them to such a degree as would occasion no regret in the event of war."

Along this line, the committee warned against the temptation to meet domestic deficiencies with imports to tide us over until synthetic production costs can be brought down to those of natural oil.

The same idea was stressed in touching upon the present negotiation of a new reciprocal trade agreement involving oil, on which the committee, however, express no position.

Fear of Foreign Oil

"An inundation by low-cost foreign oil could not help but injure the secondary recovery of domestic oil," it pointed out; "it would stifle many an independent enterprise which, to exist, must make a profit under the high-cost conditions. The danger of this flood is what the 'independent' domestic producer fears."

"Crude reserves in the ground, no matter how vast, are useless in an emergency unless they are producible to meet the emergency," it said at another point. And to insure their producibility, research must be maintained, geological and engineering expertness must uninterruptedly progress, wildcat drilling must flourish, exploration must take place "and an industrial esprit de corps unhampered by governmental or monopolistic encumbrances or restraints must illumine the whole."

The American companies most active in foreign operations also have important interests in domestic production, O'Mahoney said, and therefore are not likely to attempt to import oil in volumes which would hamstring the domestic industry, but, he added, "the danger of a world surplus of petroleum flowing into the U. S. to destroy the market of the independent oil operator could be readily averted by an increased industrialization in foreign countries and by an improvement of living standards whereby the use of motor vehicles would become more general throughout the world."

Reverting to the domestic situation, the committee suggested that the naval petroleum reserves in Buena Vista Hills, Teapot Dome and Elk Hills be turned over to the Interior Department to be administered as public lands and opened to general development, with safeguards around any present contracts, since the total estimated recoverable oil from these reserves, around 376 million barrels, would be of little or no assistance in the event of war.

Without attempting to evaluate the results, the committee suggested that new courses of domestic petroleum might be obtained through a program of a) new exploratory drilling on the public domain and elsewhere; b) deeper drilling to horizons hitherto untested; c) stimulated production from oil fields by improved methods of secondary recovery and by payment of governmental subsidies (but the committee emphasized it took no position for or against a subsidy program); d) exploration of the continental shelf; e) manufacture of gasoline and other products from natural gas, and f) synthetic production from oil shale, coal and agricultural commodities.

Importance of Near East

In a press conference, accompanied by Senator Ed Moore of Oklahoma, ranking Republican member of the committee, O'Mahoney emphasized the importance of a strong international policy by referring to the recent Arabian-American deal with Standard Oil Company (New Jersey) and Socony-Vacuum Oil company.

The Saudi Arabia situation is important, he said, because there is involved some 30 billion barrels of oil as compared with domestic reserves of 20,800 billion barrels.

"The magnitude of petroleum development abroad is so great that the organizations which carry it on attain the proportions of government, and you have developed a partnership between political governments and industrial concerns. This is a matter of tremendous significance which will require a great deal of study," he said, adding that it might be a matter for the special oil committee if it is revived.

OGD Plugs for Budget; Vickers Named to Council

Oil and Gas Division officials are hopeful that their appearance before the House Appropriations subcommittee in charge of the Interior Department supply bill for 1948 will result in approval of the $463,900 requested for enforcement of the Connally Hot Oil Act and the other responsibilites placed upon them when the division was set up.

OGD needs and plans for the future were reviewed by the subcommittee in closed hearings, but it was learned that the group appeared impressed by the fact that a man of Max W. Ball's qualifications headed the office and at a relatively small salary.

One subcommitteeman commented upon the moderate estimates, suggesting that if all plans outlined by Ball are to be carried out a considerably larger fund might be required. Ball, however, explained that he was approaching his job cautiously and was asking for funds only for projects definitely set.

A National Petroleum Council appointments committee is preparing slates for membership of the several subcommittees which are to be set up to prosecute inquiries agreed upon January 21, and is expected to complete its work this week.

Secretary J. A. Krug has named C. L. Henderson, president of Vickers Petroleum Company, Wichita, Kan., to the council from which Robert H. Colley, president of The Atlantic Refining Company, Philadelphia, and E. B. Reeser of Barnsdall Oil Company, Tulsa, have resigned.

Senator Moore, however, indicated that he would not press his resolution for revival of the committee, now before the Public Lands Committee, but would let that group make the decision.

Moore's Reservations

Moore issued an additional report, concurring in the recommendations of the committee, but making three reservations.

He expressed opposition to legislation requiring companies operating abroad to register copies of their foreign contracts with some government agency, but agreed that the basic concession agreements between foreign governments and American companies should be made known to the government. The antitrust laws, he said, could take care of any monopolistic situations that might arise as a result of foreign operations.

He agreed that encouragement of secondary recovery is essential, but opposed any form of subsidy, declaring it would lead to the destruction of the virility of private enterprise and contending that maintenance of a healthy domestic economy that will result in adequate competitive prices is the best insurance for the operation of secondary recovery projects and the preservation of stripper pools.

His third reservation was more of a clarification of the report's suggestion that the federal government take such steps as may be possible to encourage conservation, which he favored but under the restriction that the problem of enacting and enforcing conservation measures must be recognized as purely a matter for the states.

"The committee report and the policies suggested are indeed a strong argument for the competitive enterprise system which we enjoy in America and which has been the philosophy upon which our private oil industry has succeeded," Moore said. "I, therefore, emphasize that any governmental policy which encourages any department or agency of government to enter into competition with private enterprise, is contrary to this philosophy. As a corollary it follows that our national oil policy should be to discourage and, if necessary, to prohibit any department or agency of government from engaging in petroleum activities that directly or indirectly compete with our private industry.

"The report properly points out that freedom of markets in international trade and equal access to petroleum supplies for all nations are contributing factors to world peace. In this connection we should not fail to recognize that the United States is the only remaining nation in the world where the production of petroleum is not a governmental monopoly. With consciousness of this fact, it should be made clear that our agreement to these principles does not mean that we open the door to any foreign nation for the exploration of our domestic oil resources in competition with our private industry. Reciprocity in this regard should be limited to the citizens and nations of foreign countries. Likewise, the United States government should respect such policy by refraining from engaging in the petroleum business abroad."

Early Oil Pact Consideration Urged; State Department Studies Foreign Oil

State Department officials are hopeful that the Senate Foreign Relations Committee takes up the Anglo-American petroleum agreement before Chairman Arthur H. Vandenberg of Michigan leaves —if he does—to accompany Secretary of State Marshall to Moscow early in March.

The agreement is third on a list which the department has submitted to the committee, showing the order in which it hopes various pending agreements will be taken up for consideration.

Meanwhile, the department is working on a report on the foreign oil situation, with special emphasis on the Middle East where Standard Oil Company (New Jersey) and Socony-Vacuum Oil Company have recently entered the picture through a buy into Arabian-American Oil Company.

The report, which is to be submitted to the White House from where it may be sent along to the Foreign Relations Committee for consideration in connection with the agreement, is being prepared with the cooperation of several other agencies, including the Commerce, Interior, War and Navy Departments and Tariff Commission.

During the inter-agency discussions on the foreign situation, the Commerce Department is reported to have suggested the desirability of strict government control of foreign operations because they are concentrated in the hands of a few large companies. The State Department, on the other hand, is represented as favoring a broadening of the field so as to bring some of the smaller companies into foreign activities, and the report to the White House may make some recommendations to this end.

Since Vandenberg will be absent from Washington for some time if he goes to Moscow, the State Department is hopeful of having the Anglo-American agreement brought up sometime during the last half of this month. Officials believe that hearings on the matter would not take very much time, since opposition to the agreement is largely concentrated in Texas, and are confident also that Senate ratification would be quickly forthcoming once the agreement was reported by the Foreign Relations Committee.

February Demand Remains At the January Figure

Demand for domestic crude will remain unchanged during February at the January estimated level of 4,640,000 barrels daily, according to the monthly forecast of the Bureau of Mines, which disclosed that as a result of current trends it now believes its forecast of motor fuel demand for the current quarter, issued in December, may be as much as 6 million barrels below requirements.

Preliminary figures placed total demand for all oils in the final quarter of 1946 at 505 million barrels, of which 30 million represents exports, a decline.

While the total forecast demand for this month is unchanged, the Bureau shifted the figures for a number of states. No changes were made in the forecasts for Texas, 2,030,000 barrels, or California, 838,000, but Louisiana was increased from 382,000 to 387,000 barrels, Kansas from 260,000 to 263,000; Mississippi from 62,000 to 66,000 and Ohio from 7600 to 7800, while Oklahoma was cut from 375,000 to 370,000 barrels; Illinois from 209,000 to 204,000, Montana from 24,000 to 23,000, Indiana from 19,000 to 18,000 and West Virginia from 8400 to 8200.

Crash Kills Four

Four members of Colombian Gulf Oil Company's staff were among those lost in the crash of an airliner in the Middle Magdalena River Valley jungles January 22.

Paul H. Boots, assistant manager for the Gulf interests in Colombia was aboard the plane and was killed in the wreck. Also were: Arthur Kimball Dacy recently employed to take over the company's industrial relations duties in Colombia; Dr. Rafael Navia, Colombian citizen and attorney for Gulf in Bogota, and Jorge Cortazar, personnel clerk in the Bogota offices.

U. S. Crude Oil Production

(Estimates compiled by THE OIL WEEKLY. All figures indicate daily averages in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED Feb. 1	Jan. 25
Alabama	900	600
Arkansas	72,400	72,500
California	883,200	901,400
Colorado	37,450	38,200
Florida	245	240
Illinois	195,900	200,500
Indiana	18,000	17,200
Kansas	284,700	285,300
Kentucky	27,750	27,750
Louisiana	408,725	408,375
North Louisiana	95,100	94,750
South Louisiana	313,625	313,625
Michigan	45,000	42,300
Mississippi	87,550	87,850
Missouri	100	100
Montana	20,500	21,000
Nebraska	700	700
New Mexico	103,500	103,500
New York	13,100	13,650
Ohio	8,100	8,000
Oklahoma	365,150	364,650
Pennsylvania	34,400	36,000
Tennessee	35	35
Texas	1,931,615	1,931,615
Tex. R. R. Comm. Districts:		
Dist. 1—S. Central	19,085	19,085
Dist. 2—Lower Gulf Coast	133,110	133,110
Dist. 3—Upper Gulf Coast	412,175	412,175
Dist. 4—S. West	206,525	206,525
Dist. 5—E. Central	33,700	33,700
Dist. 6—E. Texas Field	301,000	301,000
Dist. 6—Rest of N. East	99,435	99,435
Dist. 7-B—W. Central	34,000	34,000
Dist. 7-C—West	27,585	27,585
Dist. 8—West	464,725	464,725
Dist. 9—N. Central	118,225	118,225
Dist. 10—Panhandle	82,050	82,050
West Virginia	7,700	7,750
Wyoming	107,000	112,000
Total United States	4,653,720	4,681,215

Total stocks, foreign and domestic, January 25, as reported by the Bureau of Mines were 221,655,000 barrels.

Salvage of Gas Urged by Krug

Development of a joint federal-state-industry program to salvage flared natural gas for use either as fuel or as the base for the production of gasoline and chemical was recommended to Congress today by Secretary of the Interior J. A. Krug.

This recommendation was one of a number included in Krug's annual report in which he emphasized the necessity demonstrated by war experience of speeding up the geologic mapping of the nation to show in complete detail its possible reserves of petroleum and other natural resources.

Such a study, Krug said, might cost a billion dollars and require 20 years. The government has been engaged in similar work for nearly 70 years but only about 10 percent of the country has been adequately mapped since a large part of the Geological Survey's effort has been devoted to the quick development of information valuable to the oil industry on new and expanding productive areas.

Authority for the inventory was granted by Congress some years ago but no funds have ever been specifically appropriated for it. With known reserves of some resources badly depleted by all-out production for the war, Krug believes the program should be launched immediately and on a scale which would permit its completion in much less than 20 years.

The program for conservation of natural gas now being wasted as well as the further promotion of conservation practices for the oil industry would be carried out largely through increased cooperation of the department with the Interstate Oil Compact Commission and the state authorities.

Krug also recommended continuation of studies of fuel resources both from the standpoint of expanding civilian demand and that of safeguarding the national security and urged support of the Bureau of Mines program of synthetic liquid fuel development.

He also recommended that bituminous and asphalt impregnated rocks be made available from the public lands under the mineral leasing laws, pointing out that they represent additional sources of petroleum.

International Oil Labor Committee Opens Sessions in Los Angeles Today

Labor, management and government representatives of a dozen nations will sit down today in Los Angeles to discuss the economic and social problems of the oil industry with particular emphasis on industrial relations and working conditions abroad.

The meeting, the first to be held by the International Labor Office committee on petroleum production and refining, will receive as its keynote a report from ILO headquarters in Montreal, Canada.

In its report, which will be the basis for the committee's deliberations, the ILO indicated that native oil industry workers in many countries say their wages are considerably lower than those of expatriates and that discrimination is exercised against them in regard to promotions. Food, housing and transport provisions also are matters of dissatisfaction.

The manner in which American companies have dealt with these and similar problems in the United States is set forth, and the committee was asked to consider the policies of these companies, making comparisons between the wages paid in the petroleum industry and those paid in industry generally, and between the wages paid by foreign companies and those paid by companies belonging to the countries in question.

Problems to be considered have been divided into four groups: 1) employment, including recruitment, entry into the industry, training, regularity of employment and contract labor; 2) conditions of labor, including wages, hours of work, holidays with pay, safety and health, welfare services and inspection; 3) social services, such as housing, transportation, medical care, recreation and shopping facilities, nutrition services, education and employe security and pensions; and 4) industrial relations, such as employer and worker organizations, collective bargaining, trade unions, and the importance and machinery of industrial relations.

Oil Reserves Discussed

In its report, the ILO took the position that the oil industry should look ahead far into the future in dealing with these problems, differing with those who have raised the cry of imminent exhaustion of our petroleum resources.

As the basis for this belief, the report pointed out that in 1918 it was estimated that proved and to be discovered oil in this country was only 7 billion barrels, since which time 23 billion barrels have been produced and present reserves are in excess of 20 billion barrels.

"Indeed," it continued, "all the crude oil produced in the United States to date, plus the 'proved' reserves, would occupy only about two cubic miles of space, whereas at least 2 million cubic miles of sedimentary strata exist in which to discover oil. There is plenty of room for new discoveries."

Even when natural oil is exhausted, it was said, the petroleum industry will continue in business, operating on oil shale and coal, but, it was added, "the possibility is not remote that science in the future may be able to ferret out vast deposits of crude oil that cannot be detected by presented methods.

"Utilizing atomic-age techniques, a group of scientists are now developing the theory that crude oil is formed by the radioactive transformation of familiar organic substances. Whatever may be the result of these experiments, it appears reasonably certain that vast new sources of crude oil lie ahead, as chemists duplicate formations previously made by nature."

Canada, Colombia, Egypt, France, Iran, Iraq, Mexico, the Netherlands, Peru, the United Kingdom, Venezuela and the United States are expected to be represented, each nation's delegation to consist of two representatives of government, two of industry and two of labor.

With heavy representation from the Middle and Far East, it is thought that working conditions in those areas may be a major subject. The British seem to expect so, at least.

Nationalization of Oil

Meetings of other industry committees point to the probability that at least one of the delegations will propose nationalization of the oil industry as a panacea for sub-standard working conditions, and the sessions may become a forum for the airing of ideas along that line.

The U. S. delegation will consist of John H. Q. Person, economic adviser to Assistant Secretary of Labor David A. Morse, and John Loftus, chief of the State Department Petroleum Division, with Charles Shaw, industrial relations counsel for Standard Oil Company (New Jersey), and James Tanham, vice president of The Texas Company, as employer representatives. The labor representatives will be Herbert Woods and H. M. McNeil of the AFL.

Among the delegations whose personnel has been completely or partly announced are the following:

United Kingdom: J. A. Bieck, assistant secretary of the Ministry of Labor and National Service, and K. L. Stock, assistant secretary of the Ministry of Fuel and Power, government delegates, with E. E. Jones, petroleum attache from the embassy in Washington, as adviser; H. R. C. Beard, The Shell Petroleum Company, Ltd., and R. B. Southall, National Oil Refineries, Ltd., employer representative, with R. B. Kerr, Trinidad Leaseholds, Ltd.; Brigadier S. H. Longrigg, Iraq Petroleum Company; M. A. C. MacNeill, Anglo-Iranian Oil Company, Ltd., and Sir Harold Roper, Burmah Oil Company, as advisers, and H. L. Bullock, National Union of Municipal and General Workers, and L. Daigleish, Transport and General Workers Union, labor representatives.

Colombia: Dr. Blas Herrera Anzoate, Minister of Labor, and Dr. Jose Gregorio Dias Granades, government representatives; Dr. Francisco Posada Zarate, employer delegate, and Dr. Diego Montana Cuellar, worker delegate.

Egypt: Hanafi El-Sayed Fahmy and Ibrahim Izzat, government delegates; H. E. Dr. Hassan Sadeq Pasha and Mohamed Abul Izz, employer delegates, and Hassan Taha El-Giddawy and Ramadan Aly, worker delegates.

Iran: Dr. Hussein Pirnia, head of the petroleum and concessions division of the Ministry of Finance, government representative.

France: Ch. Bettelheim, director of research and statistics for the Ministry of Labor and Social Security, and J. Robelin, chief of bureau, division of coal, of the Ministry of Industrial Production, government representatives; E. Zedet, president of the Trade Chamber of National Fuel and Lubricants, and M. de Montricher, general director of the company, "The Consumers of Petroleum," employer representatives, with M. Verdouck, of the Union of Trade Chambers of the Petroleum Industry, adviser; and Messrs. Miffre and Salze of the Federation of Chemical Industries, labor delegates, with M. Codron, petroleum engineer, as adviser.

Netherlands: Ir. J. A. Gerth, inspector of labor in the Netherlands Indies, and Dr. Ir. A. H. W. Hacke, deputy, government delegates; J. W. H. van de Wall Bake, chief of personnel relations, N. V. Bataafsche Petroleummaatschappij, and F. A. Vromans, chief of social affairs, N. V. Curacaosche Petroleum Industrie Maatschappij a Emmastad (Curacao), employer delegates, and F. Brussel, president of the Catholic Federation of Transportation Workers, and C. van Baren, president of the Netherlands Federation of Christian Transport Workers, labor representatives.

Peru: Dr. Eleodoro Romero and Enrique Montero, employer delegates with W. S. Reid, Alvin C. Hope and L. W. Berry as advisers and Dr. Aurelio Garcia Sayan and Dr. Alfredo Porras (representing the petrol companies) as observers.

State Loses Fight to Stop Gas Flow Into Big Inch

Louisiana state officials were unsuccessful last week in their attempt to shut down natural gas production in the Lucky field, Bienville Parish, an injunction sought by the state being refused by district court.

The field was granted an allowable of 30 million cubic feet daily last June but no gas was sold for lack of a market. In December, when the Little Big Inch line was opened for gas transportation, the H. L. Hunt interests, Dallas, Texas, started purchasing gas in the field and selling it to Tennessee Gas and Transmission Company.

The allowable for the field was renewed in January but gas export opponents caused Conservation Commissioner Joe McHugh to revoke the allowable.

District Public Relations Meetings Scheduled Soon

District organizing committees for the oil industry public relations program will hold meetings within two weeks, Franklyn Waltman, acting chairman of the group, said in New York last week.

The Midwest district parley will be held in Chicago February 4, and the Southwest district meeting will be held on February 6, probably in Dallas. Other district meetings will follow shortly.

Material and suggestions for the use of the organizing committees are being sent to the chairmen.

Douglas Campbell, The Pure Oil Company, was named chairman of a subcommittee to develop special events for the API annual meeting next November. John S. Cooke of API, was elected secretary of the operating group.

Companies Authorized to Extend Transmission Lines

The Federal Power Commission has authorized the Natural Gas Pipeline Company of America and Texoma Natural Gas Company to construct additions to their gas transmission system from the Panhandle field in Texas to Indiana, Iowa, Kansas, Nebraska, Wisconsin and Illinois at an aggregate cost of $23,493,987, to increase Natural's capacity to 484 million cubic feet daily.

The commission also authorized the Chicago District Pipeline Company to construct 11 miles of 24-inch line to complete the looping of its Crawford line, at a cost of $750,000, to enable it to increase its receipts from Natural by 95 million cubic feet daily for delivery in Chicago.

As outlined by the companies, Natural will construct a 5000 horsepower compressor station near Hooker, Okla.; 39 compressor units in existing stations and approximately 110 miles of 24 and 26-inch main loop line, and Texoma will install nine compresor units in its station near Fritch, Texas, build a 1500-horsepower compressor station in Moore County, Texas, and lay 10½ miles of 26-inch and 15½ miles of 16-inch pipe line.

Texoma owns and operates producing facilities in the Panhandle field of Texas and a transportation system extending to Gray, Okla.

Haskell County System Is Placed In Operation

Toronto Pipe Line Company has placed in service an 8-mile 4-inch crude gathering system that links the Lawson and Humphrey-Chapman pools, Haskell County sector of North Texas, to a tank car rack at Haskell. The two areas are producing 500 barrels of sweet crude daily. Toronto's gatherings will be consigned by rail to British American Oil Producing Company's Canadian refineries.

Preliminaries on Magnolia Texas Line About Finished

Preliminary survey work on The Texas Pipe Line Company's portion of a proposed products pipe line from Spindletop, near Beaumont, to Dallas and Fort Worth, is nearing completion and actual construction work is expected to start in April or May.

The line is being constructed jointly by The Texas Pipe Line Company and Magnolia Pipe Line Company. Magnolia is building the first leg of the line, a 12-inch carrier from Spindletop to Hearne, with The Texas Pipe Line Company extending the line from Hearne to Dallas and Fort Worth with a 10-inch carrier. Texas also is building an 8-inch extension to the products line from Hearne to Austin with a 6-inch line extending from Austin to San Marcos. At San Marcos the carrier will connect with an existing 6-inch line that will run products into San Antonio.

The Texas Pipe Line Company is making preliminary studies on its announced 16-inch 60-mile line from West Columbia, Brazoria County, Texas, to Houston, and 22-inch 80-mile line from Houston to Port Arthur and Port Neches. Construction on these is not expected to start until the latter half of 1947.

Stanolind Route Changed

Stanolind Pipe Line Company has diverted its 6000 to 8000 barrels of daily crude runs from southeastern New Mexico and Winkler and Ward counties, Texas, to Shell Pipe Line Corporation for transportation to Cushing, Okla., where the oil will enter Stanolind's trunk line system. This low-gravity crude carries a high-lube content, and Stanolind has been routing its gatherings for more than a decade from its Wink, Texas, tank farm via Humble Pipe Line Company's carrier to Ranger, where connection was made with Stanolind's mid-continent system.

Partnership Formed

Two West Coast pipe line construction companies, Pacific Pipeline Construction Company and Engineers, Limited, have formed a partnership to be known as Pacific Pipeline & Engineers, Limited. The new firm will conduct a general pipeline construction business.

Pacific Pipeline Construction Company has built many California oil and gas lines. Engineers, Limited, has done construction work on pipe lines in California, South America, and also constructed portions of the Big Inch line and Tennessee Gas and Transmission Company's lines.

Teague Named Chairman Houston Chapter of API

J. U. Teague, production manager for Hogg Oil Company, Houston, was elected chairman of the Houston Chapter, API, at a meeting held January 29, succeeding Lawrence O'Donnell, chief regional mechanical engineer of Shell Oil Company. Other officers elected are: first vice chairman, John Neal, Gulf Coast division manager, Lane - Wells Company; second vice chairman, Tucker Pennington, senior engineer, Humble Oil & Refining Company; and secretary-treasurer, Orien Van Dyke, chief engineer, Magnet Cove Barium Company.

J. U. Teague

An advisory board also was elected as follows: for two-year term—Warren L. Baker, The Oil Weekly, Sam Oliphant, Stanolind Oil & Gas Company, Harold Decker, Pan American Production Company, John E. Eckel, Oil Center Tool Company, and D. G. Hawthorne, consulting engineer; one-year term—I. W. Alcorn, The Pure Oil Company, and Lawrence O'Donnell.

New Pipe Line Plan for Phillips in West Texas

Phillips Petroleum Company will utilize 3500 to 4000 barrels daily of its controlled production in West Texas in supplying the crude deficit at its 45,000-barrel daily capacity refinery at Borger, Texas Panhandle district by routing this volume of oil through the products line of the Mextex Pipe Line Company, a subsidiary. This arrangement will continue, and possibly be enlarged by setting more booster units on the products carrier until Standish Pipe Line Company, crude transportation subsidiary of Phillips, receives pipe in 1948 for the construction of a projected 289-mile 12-inch crude carrier from West Texas to the Borger refinery.

Standish is gathering about 12,000 barrels daily in the Martin - Ellenburger, West Andrews, Embar and Goldsmith fields and making deliveries from its Goldsmith terminal to Gulf Refining Company, pipe line division. The company has built 3 miles of 6-inch crude line from this terminal to connect with the Mextex's products line which consists of 6-inch to Border station, western Gaines County and east of the Hobbs field and 240 miles of 8-inch from the latter point to Borger. The crude will be commingled with the 12,000 barrels of daily runs of natural gasoline and butane obtained from plants in West Texas and Southeastern New Mexico.

Northern Natural Men Cross-Examined by FPC

A Federal Power Commission hearing was resumed in Kansas City last week on the application of the Northern Natural Gas Company to construct a 24-inch pipeline in addition to existing lines between the natural gas field near Hugoton, Kan., and St. Paul and Minneapolis.

B. R. Bay, president of Northern Natural, the first witness, explaining that the company has a working agreement covering distribution of gas in the St. Paul area with the Northern States Power Company. His company is ready to reach a complete agreement with Northern States covering all distribution phases, but is awaiting the commission's action on its application.

W. L. Shomaker, Omaha, Nebr., superintendent of gas sales for Northern Natural, bore out that company's contention that increased demands upon it for gas would justify the expansion.

Third of Right-of-Way Ready

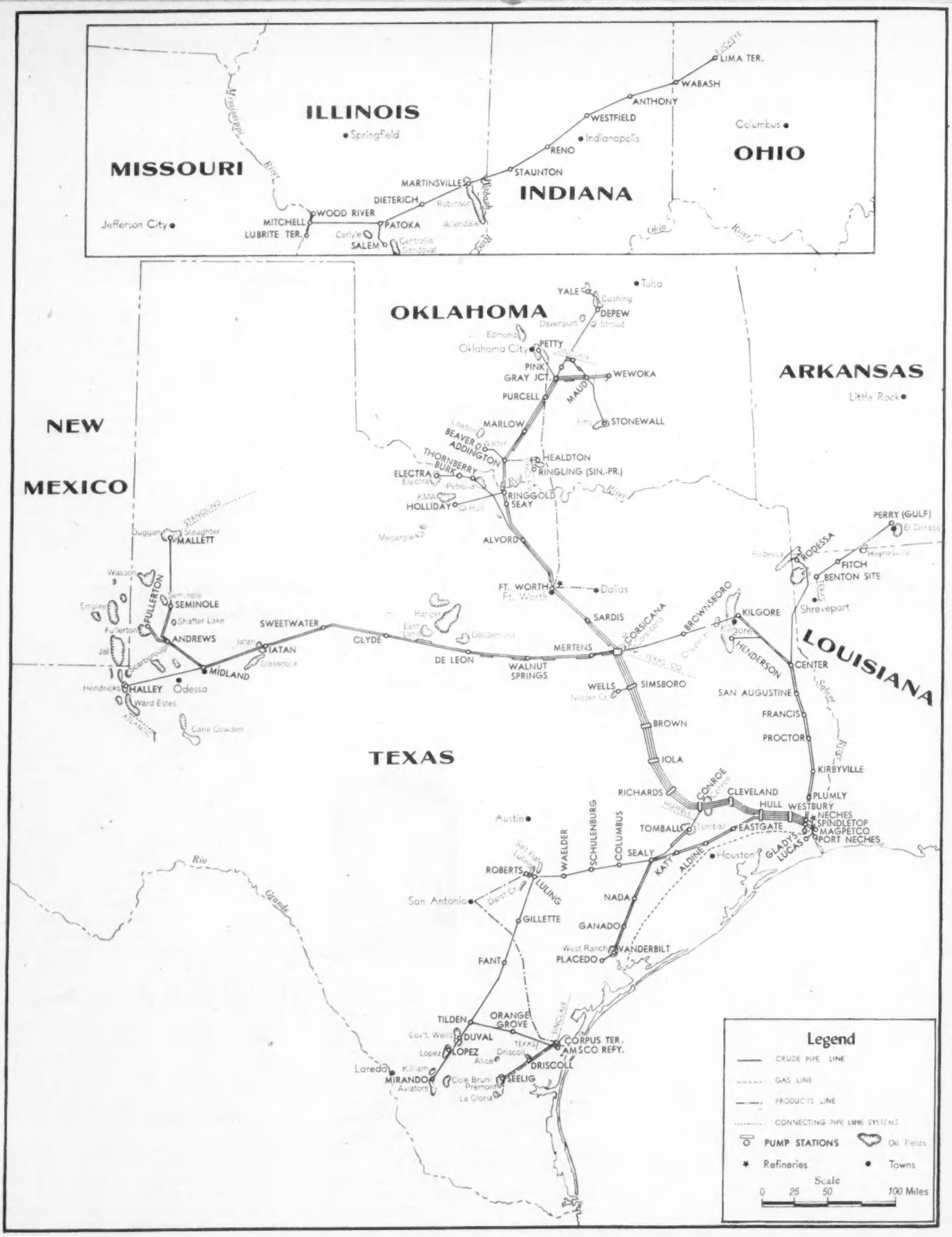
Magnolia Pipe Line Company has completed about one-third of the right-of-way for its projected 650-mile 20-inch crude line that will extend from its Corsicana, Texas, trunk line junction to Patoka, Ill., terminal on its Wood River, Illinois-Lima, Ohio, 10-inch relay line.

Construction is scheduled to start when pipe deliveries begin in May, and the system is due to be completed during the first quarter of 1948. It will have an initial capacity of 100,000 barrels daily, using 8 mainline stations.

Pipe Lines of the U. S.

Magnolia Pipe Line Company

First of a Series



THE extensive pipe line system of Magnolia Pipe Line Company and Magnolia Petroleum Company is the first in a series of company pipe line system features to be presented each week by THE OIL WEEKLY. This feature will include gas lines as well as crude and products lines.

The two Magnolia companies operate 6040 miles of trunk lines and 2430 miles of gathering lines, divided as follows:

Magnolia Petroleum Company—Trunk Lines: 830 miles products and 190 miles gas.

Magnolia Pipe Line Company—Trunk Lines: 4800 miles crude and 220 miles butane.

Magnolia Pipe Line Company—Gathering Lines: 2400 miles crude and 30 miles butane.

By JAMES S. CRITZ
Staff Writer

The butane line of Magnolia Pipe Line Company runs from the Kinsloe Butane station near Kilgore, East Texas, to Port Neches on the Texas Coast.

Magnolia has authorized the construction of a 650 mile 20-inch crude transmission line that will run from Corsicana, Texas, to Patoka, Ill., thereby connecting the Texas-Oklahoma system with that in Illinois.

Distances, Sizes and Elevations On Pipe Lines of Magnolia Pipe Line Company and Magnolia Petroleum Company

WEST TEXAS TO CORSICANA TERMINAL

STATION TO STATION	Elev.		Elev.	Pipe Diameters and Their Mileage Between Stations
Mallett	3548	Seminole	3246	8-in. 50.8 mi.
Seminole	3246	Andrews	3202	Two 8-in. 28.8 mi. ea.
Fullerton	....	Andrews	3202	6-in. 13.6 mi: 7-in. 13.6 mi.
Andrews	3202	Midland	2747	Two 8-in. 35.7 mi. ea.
Halley	2778	Midland	2747	10-in. 63.7 mi.
Midland	2747	Iatan	2260	8-in. 53.1 mi; 12-in. 43.1 mi.
Iatan	2260	Sweetwater	2236	8-in. 45.4 mi; 12-in. 45.4 mi.
Sweetwater	2236	Clyde	1981	8-in. 51.0 mi; 12-in. 51.0 mi.
Clyde	1981	De Leon	1236	8-in. 62.8 mi; 12-in. 62.8 mi; 8-in.loop 12.8 mi.
De Leon	1236	Walnut Sp.	914	8-in. 48.7 mi; 12-in. 48.7 mi; 8-in. loop 22.4 mi.
Walnut Sp.	914	Mertens	554	8-in. 50.8 mi; 12-in. 50.8 mi; 8-in. loop 23.4 mi.
Mertens	554	Corsicana	430	8-in.24.2 mi; 12-in. 23.4 mi; 8-in. loop 11.7 mi.

OKLAHOMA TO CORSICANA TERMINAL

Yale	....	De Pew	880	6-in. 21.8 mi.
De Pew	880	Pink	1120	8-in. 47.4 mi.
Pink	1120	Gray Jct.	1182	8-in. 8.3 mi.
Petty	1173	Gray Jct.	1182	8-in. 26.6 mi.
Wewoka	....	Maud	....	Comb. 4 & 6-in. 18.7 mi; comb. 5 & 6-in. 18.5 mi.
Maud	....	Gray Jct.	1182	Comb. 5 & 6-in; 24.4 mi: comb. 5 & 6-in. 24.3 mi; 6-in. 24.4 mi; 6-in. loop 6.2 mi.
Stonewall	663	Maud	....	Comb. 5 & 8-in. 34.5 mi.
Gray Jct.	1182	Purcell	1044	Three 8-in. 15.6 mi. ea.
Purcell	1044	Marlow	1053	Three 8-in. 31.7 mi. ea.
Marlow	1053	Addington	955	Two 8-in. 28.2 mi. ea.; 8-in. 17.6 mi.
Beaver	....	Addington	955	6-in. 17.2 mi.
Healdton	890	Addington	955	Comb. 6 & 8-in. 22.1 mi.
Addington	955	Ringgold	796	Two 8-in. 25.4 mi; 8-in. 4.9 mi.
Holliday	1002	Ringgold	796	8-in. 41.1 mi.
Ringgold	796	Seay	....	Two 8-in. 7.7. mi. ea.
Seay	....	Alvord	798	Two 8-in. 32.9 mi. ea.
Electra	1195	Burk	....	6-in. 19.4 mi.
Burk	....	Thornberry	....	8-in. 12.1 mi.
Thornberry	....	Alvord	798	8-in. 61.6. mi.
Alvord	798	Ft. Worth	620	Two 8-in. 44.2 mi. ea.; 8-in. 44.2 mi.
Ft. Worth	620	Sardis	616	Two 8-in. 37.5 mi. ea.
Sardis	616	Corsicana	430	Two 8-in. 37.2 mi. ea.; 8-in. 32.9 mi

ARKANSAS AND EAST TEXAS

Perry (Gulf)	....	Fitch	244	8-in. 53.6 mi.
Fitch	244	Benton Site	214	8-in. 18.9 mi.
Rodessa	181	Center	273	8-in. 89.3 mi.
Kilgore	228	Center	273	10-in. 59.0 mi; 5½-in. 59.1 mi.
Henderson	....	Main Line	....	6⅝-in. 22.9 mi.
Kilgore	228	Brownsboro	400	12-in. 48.6 mi.
Brownsboro	400	Corsicana	430	12-in. 53.2 mi.
Center	273	San Augustine	493	8-in. 17.4 mi.
Center	273	Francis	284	4½-in. 37.2 mi.
San Augustine	493	Francis	284	8-in. 19.5 mi.
Francis	284	Proctor	470	8-in. 18.0 mi.
Francis	284	Kirbyville	118	4½-in. 40.1 mi.
Proctor	470	Kirbyville	118	8-in. 25.1 mi.
Kirbyville	118	Plumly	42	8-in. 23.5 mi; 4½-in. 26.5 mi.
Plumly	42	Neches	....	8-in. 20.0 mi; 4½-in. 16.5 mi.

CORSICANA TERMINAL TO PORT NECHES

Corsicana	430	Simsboro	520	Three 8-in. 30.9 mi. ea; 10-in. 30.9 mi.
Wells	....	Simsboro	520	6-in. 9.5 mi.
Simsboro	520	Brown	555	Two 8-in. 33.9 mi. ea; 8-in. 33.6 mi; 10-in. 33.6 mi.
Brown	555	Iola	340	Two 8-in. 28.1 mi. ea; 8-in. 27.9 mi; 10-in. 27.8 mi.
Iola	340	Richards	285	Three 8-in. 25.9 mi. ea; 10-in. 25.9 mi.
Richards	285	Conroe	180	Three 8-in. 26.6 mi. ea; 10-in. 26.6 mi.
Conroe	180	Cleveland	135	Three 8-in. 25.6 mi ea; 10-in. 25.5 mi.
Cleveland	135	Hull	57	Two 8-in. 31.4 mi. ea; 8-in. 29.2 mi; 10-in. 31.4 mi.

CORSICANA TERMINAL TO PORT NECHES—Continued

Hull	57	Westbury	39	Four 8-in. 21.1 mi. ea; 10-in. 21.1 mi.
Westbury	39	Spindletop	....	Two 8-in. 14.3 mi. ea; 8-in. 14.2 mi; 8-in. 14.1 mi; 10-in. 14.1 mi.
Spindletop	....	Neches	....	Three 8-in. 2.4 mi. ea; 10-in. 2.4 mi.
Spindletop	....	Magpetco	....	8-in. 7.7 mi; 10-in. 7.9 mi.
Spindletop	....	Gladys	....	8-in. 1.8 mi.
Neches	....	Port Neches	....	8-in. 11.7 mi.
Neches	....	Lucas	....	6-in. 2.7 mi; 8-in. 2.8 mi.

SOUTH TEXAS

Mirando	750	Lopez	602	8-in. 23.5 mi.
Lopez	602	Duval	478	8-in. 14.2 mi.
Duval	478	Tilden	670	8-in. 14.4 mi.
Seelig	141	Driscoll	64	6-in. 25.1 mi.
Driscoll	64	Corpus	....	6-in. 19.8 mi.
Corpus	....	Orange Grove	185	8-in. 33.2 mi.
Orange Grove	185	Tilden	670	8-in. 34.4 mi.
Tilden	670	Fant	344	8-in. 49.5 mi.
Fant	344	Gillette	358	8-in. 36.4 mi.
Gillette	358	Luling	347	8-in. 37.4 mi.
Roberts	....	Luling	347	Two 6-in. 8.7 mi. ea.
Luling	347	Waelder	327	8-in. 21.8 mi.
Waelder	327	Schulenburg	278	8-in. 20.2 mi.
Schulenburg	278	Columbus	210	8-in. 24.4 mi.
Columbus	210	Sealy	156	8-in. 23.4 mi.
Placedo	....	Vanderbilt	28	6-in. 14.3 mi.
Vanderbilt	28	Ganado	68	8-in. 18.3 mi; 4 & 8-in. 18.0 mi.
Ganado	68	Nada	143	8-in. 23.5 mi; 10-in. 23.5 mi.
Nada	143	Sealy	156	8-in. 31.3 mi; 10-in. 31.3 mi.
Sealy	156	Tomball	150	8-in. 20.5 mi; 8-in 20.1 mi; 6-in. 20.1 mi.
Tomball	150	Conroe	180	8-in. 18.0 mi.
Sealy	156	Katy	134	Two 8-in. 23.2 mi. ea.
Katy	134	Aldine	70	Two 8-in. 24.2 mi. ea.
Aldine	70	Eastgate	62	Two 8-in. 23.9 mi. ea.
Eastgate	62	Hull	57	Two 8-in. 23.8 mi. ea.

ILLINOIS-INDIANA-OHIO PIPE LINE

Wood River	....	Mitchell	415	10-in. 7.3 mi.
Mitchell	415	Lubrite Ter.	....	Comb. 6 & 8-in. 16.5 mi.
Mitchell	415	Patoka	480	10-in. 54.9 mi.
Patoka	480	Salem	478	10-in. 10.9 mi.
Patoka	480	Dieterich	558	10-in. 36.7 mi.
Dieterich	558	Martinsville	578	10-in. 39.2 mi.
Martinsville	578	Staunton	674	10-in. 36.4 mi.
Staunton	674	Reno	906	10-in. 34.3 mi.
Reno	906	Westfield	869	10-in. 39.8 mi.
Westfield	869	Anthony	902	10-in. 38.1 mi.
Anthony	902	Wabash	900	10-in. 39.5 mi.
Wabash	900	Lima Ter.	865	10-in. 37.0 mi.

PRODUCTS PIPE LINES

Falfurrias	....	Seelig	....	4-in. 11.7 mi.
Seelig	....	Corpus	....	6-in. 51.4 mi.
Roberts	....	San Antonio	....	3-in. 50.0 mi.
San Antonio	....	Corpus	....	Comb. 4 & 6-in. 132.8 mi.
Dallas	....	Ft. Worth	....	3-in. 31.8 mi.
Ft. Worth	....	Okla. City	....	4-in. 188.7 mi.

GAS LINE—TEXAS COAST

163.2 miles of 14-inch and 29.8 miles of 16-inch.

Note: Magnolia Pipe Line Company has authorized the construction of a 20-inch crude line that will connect the Corsicana terminal to that at Patoka, Illinois.

NEW TECHNIQUE COMBATS Electrolysis

By R. B. WALTER

STEADILY mounting operating costs are resulting from corrosion of submerged well equipment such as casing, tubing, rods and pumps, especially in older oil fields where the water content of the gross fluid produced is gradually increasing. Many wells in such areas are being abandoned because of the prohibitive cost of replacement and the difficulties operators have encountered in combating corrosion.

With certain qualifications, corrosion may be said to be caused by chemical and electrolytic action. Some electrical action occurs whenever chemical compounds are dissolved and/or ionized, and new ones formed, so that to assert that one type of corrosion is purely chemical, is incorrect. Nor can it be said that corrosion is purely electrolytic since there is an attendant chemical action when an element is dissolved by the electrolyte.

For discussion purposes in this article corrosion will be described broadly as "chemical" and "electrolytic" corresponding to the main causes of each.

Treater Unit Described

Several chemicals or chemical compounds are now being used to combat chemical corrosion with varying degrees of success. About a year ago a new technique employing a mechanical or metallic treater was introduced to combat electrolytic corrosion or electrolysis, as it is properly called. The initial field of operations was an area in Southern California where electrolysis was so severe that only a two-weeks' run for a pump was not uncommon. The treater, which was installed in a "hot" well and where electrolytic corrosion was most severe, consisted of a 15-foot rod threaded at each end, on which was strung an alternating series of copper and zinc plates, which began and ended with the former, so that there was one more copper plate than zinc. Each plate was separated from the next by a brass spacer ring. The plates and spacer rings were drawn together and held by nuts screwed onto each end of the rod (Figure 1).

This test well was approximately 4200 feet deep and was being produced with an insert pump through 2½-inch tubing. It was making about 700 barrels gross fluid, cutting about 90 percent. The treater was run on the bottom of the pump and was connected to the section of the pump in which the standing valve is placed by means of a perforated adapter so that when the pump was seated the treater remained stationary.

A five-foot section of the anchor in the tubing string was perforated so that the perforations were opposite the center third of the treater when installed, with the upper third above the perforations and the lower third below them. The well fluid entering the tubing through the perforations surrounded the central third of the treater and flowed up around the top third through the perforated adapter into the pump so that in reality the working portion of the treater was only ten feet long or two-thirds of its total length.

Figure 1 (top left). Section of treater consisting of an alternating series of copper and zinc plates spaced by brass separator rings.

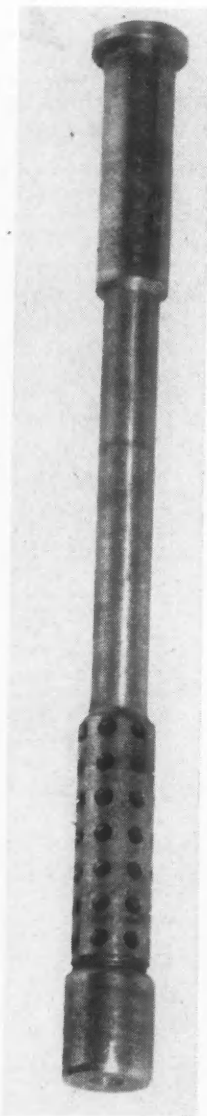


Figure 2 (lower left). Perforated adapter for use in connecting treater to insert-type pump, cup hold-down.

Figure 3 (right). Perforated adapter for use in connecting treater to insert-type pump, mechanical hold-down.

The past record of this well indicated that the corrosive action of the fluid produced was so severe that pump runs of but two weeks were common with the so-called regular, or standard, pump used in producing most wells in that area. Both rods and tubing were so severely attacked by the corrosive fluid that the electrolytic corrosion was very noticeable after use of but 30 days.

At the time the treater was installed, three new sucker rods were placed in the rod string, one immediately above the pump, one about the middle of the string, and the third at the top. Three new joints of tubing were placed in the tubing string in about the same relative positions as the new rods in the rod string. These new rods and joints of tubing were introduced as a check on the protection offered them by the treater.

At the end of the first 30-day run, the rods, pump plunger, and treater were pulled for inspection. The new rods were found to be in excellent condition—no electrolysis—although considerable had been expected. The pump plunger was in perfect condition except for normal wear. Upon examining the treater it was found that two of the zinc plates opposite the perforations in the tubing had disappeared or were entirely dissipated. The remaining ones had been attacked by the fluid with a small percent of them having been dissolved. The treater, pump plunger, and string of rods were rerun as pulled.

Another inspection of the string of rods, pump plunger and treater was made at the end of another 30-day run, or after a total run of 60 days. This time the standing valve was apparently sanded up so that the treater was not recovered. It is interesting, however, that the new or test rods that had been placed in the rod string at the start of the test were still in good non-corroded condition and the plunger was found perfect except for normal wear. Both the pump plunger and string of rods were again rerun as pulled.

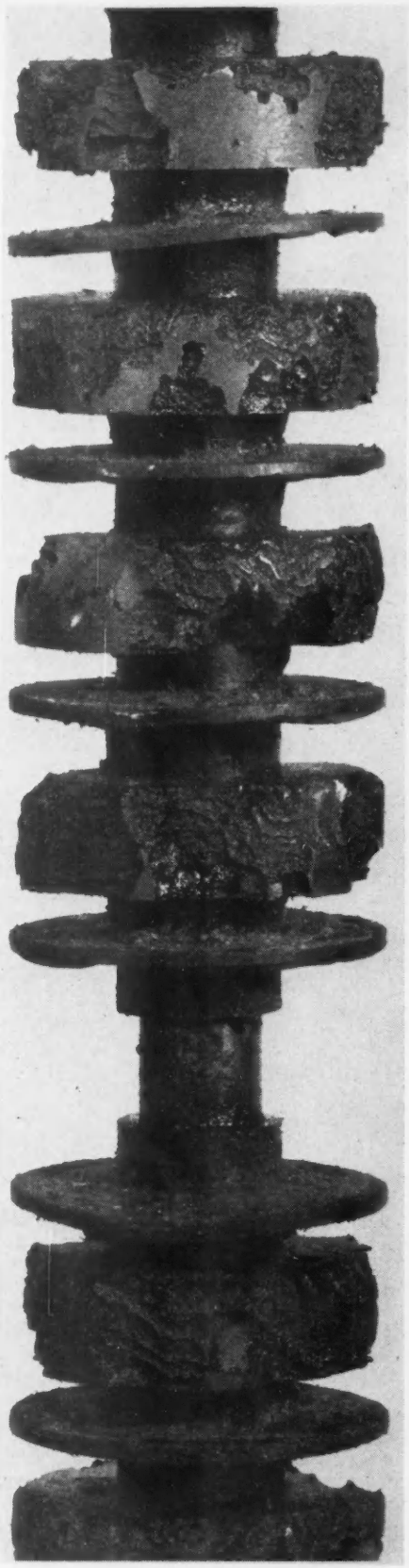
The string of rods, pump plunger, treater and tubing were pulled for a third inspection at the end of another 25-day run, making a total run of 85 days. The pump plunger was found to be in a non-corroded condition, as were both the test rods and joints of tubing which under normal operating conditions prior to installing the treater would have shown an excessive amount of corrosive action in that length of time. It was found that approximately 15 to 20 percent of the zinc of the treater had been dissolved or eaten away by the well fluid.

Electrolytic corrosion or electrolysis

is due to the presence of two dissimilar metals in an electrolyte. This statement is based on the principle that, "Whenever two dissimilar metals or their salts are placed in an electrolyte and are connected by an electrical conductor, such as a piece of copper wire, an electromotive force will be generated passing from the negative metal or cathode, to the positive or anode. This electromotive force will continue to be generated, until the former metal and/or electrolyte are entirely consumed." All bases, acids and salts in solution are electrolytes.

Water flowing through its surface and underground courses comes in contact with and dissolves in varying amounts numerous soluble mineral salts, the most common and widely distributed being the carbonates, chlorides, sulphides, sulphates, nitrates and silicates of calcium, aluminum, sodium, and magnesium, as well as the oxides of iron and aluminum. Going into solution with water some of the alkaline salt compounds, as the sulphates, are broken down, or ionized, so that the principal or primary elements, sodium, and calcium, both positively charged, are separated respectively from the negatively charged SO_4 or sulphate radical, in which the sulphur and oxygen are bonded because of the greater affinity of the former for the latter, than for the elements sodium and calcium. These two elements are present in the fluid as positive ions, or are electrically charged due to the loss of one or more of the electrons of their atomic structure which in turn were absorbed by the SO_4 or sulphate radicals. These sulphate radicals having absorbed a given number of electrons, or negative electricity, greatly intensify the fluid or electrolyte. By reason of the difference in potential between the ions of sodium, calcium and those of any other alkaline salt compound that may be present, and the electrically charged or ionized radicals an electromotive force is created which has a definite voltage and current density. These forces increase in density where fluids (electrolytes) are treated under pressure and increased temperatures. This electromotive force constitutes one of the three principal electrical systems under these conditions.

Steel used in the manufacture of boilers, tanks of all types—both for storing and heating fluids—heaters and treaters as they pertain to the oil industry as well as that used in making equipment pertinent to the production of oil is an alloy of iron and several other metals, as chromium and nickel. In addition to having some alloy metal embodied in it, the steel contains a certain amount of impurities as manganese, carbon, and silicon. Iron, which makes up the body of all steel, is amphoteric, that is, it exhibits both acid and alkaline characteristics and will react to either positive or negative fields and can be either magnetic or nonmagnetic, and therefore reversible with its electrode potential being either plus or minus. The elements mentioned as being alloyed with iron in the making of steel all exhibit positive characteristics. Manganese and chromium are two of the strongest electromotive force series of elements known having electrode potentials of approximately 1.10 volts and 0.71 volts, respectively. In the presence of an active electrolyte as described and under recurring stress, due to heat and pressure that occurs both in tanks and other vessels used for storing and heating fluids as well as in oil wells, galvanic cells or couples are created within the body of the steel used in the manufacture of such equipment. These galvanic cells are created because of the difference in potential between the alloys in the metal and the iron, chief component of the metal. This difference in potential between the manganese and the iron is approximately 1.8 volts and 1.5 volts between the chromium and the iron. These multiple cells generate an electric current through the same reactions as the simple galvanic cell with the negative electrode, or iron in the metal, being gradually decomposed as it furnishes the fuel for the cells through the action of the electrolyte (fluid) upon it. This action causes the so-called electroyltic corrosion or electrolysis, so commonly found in the metal of all vessels containing fluid under temperature and pressure, as well as in that of the pump, rods, tubing and casing of an oil well. These galvanic cells constitute or make up the second electrical system, with a third system being created by the difference of potential between the metal alloys and the electrolyte materials.



Section of treater after having been used in a California oil well for about 90 days.

In the galvanic cells just described an alloy of the iron and/or an impurity in the steel forms the positive pole, while the iron itself, chief component of the steel, forms the negative one. The fluid or electrolyte attacks the iron (or negative pole) freeing positively charged ions which unite with any one of several negatively charged ions present in it to form stable compounds. The electrons of the negative pole then move to the positive pole of that particular galvanic cell, due to the difference in potential created between the poles, where they in turn are absorbed by one of the many positively charged ions of the solute material in the electrolyte. This action, electrolytic corrosion or electrolysis, will continue indefinitely or as long as the two dissimilar metals exist in the presence of the electrolyte. The severity of the corrosive action, generally speaking, depends almost entirely upon the temperature and the type of the electrolyte present, though severe cases of electrolysis are often due to natural erosion and corrosion working hand in hand. This is particularly true where the moving parts in an oil well continue to present a fresh surface for the electrolyte to attack through their erosive action.

In a field in Southern California where electrolysis was exceptionally severe, a string of tubing manufactured from high carbon steel was run in an attempt to combat the corrosive action of the fluid. The experiment was unsuccessful, as the string developed leaks rapidly and had to be discarded. The writer believes that the high carbon content of the steel was responsible for the rapid deterioration, for the carbon became the positive pole of galvanic cells around which the electrolysis developed.

Treater Unit

The treater unit described earlier in this article is being successfully used to combat electrolysis in a number of oil producing areas. It is made of copper and zinc, two of the most common and powerful electromotive force elements known, so arranged as to form a series of galvanic cell couples capable of generating an electromotive current having a density several times as great as that of the electrical systems existing in the fluid. When the treater unit is immersed in an electrolyte (fluid being treated under pressure and temperature) the zinc plates are attacked by it.

Zinc, while one of the strongest and most active negative metals, is covered

with positive ions or protons that are dissolved and released when immersed in an electrolyte. Positive zinc ions released into the fluid react in two ways in combatting any electrolytic corrosion present. First, and most important, these ions being strongly positive, are attracted by the active negative poles of the galvanic cell couples in the body of the metal forming a film over them that might be described as plating, or polarizing them, thereby tending to prevent any further action. Second, these positive zinc ions tend to unite with the negatively charged radical ions present in the fluid to form any one of several zinc compounds, thereby reducing the strength of the electrolyte and its ability to attack the iron of the metal, which in turn reduces the activiy of the galvanic cell couples.

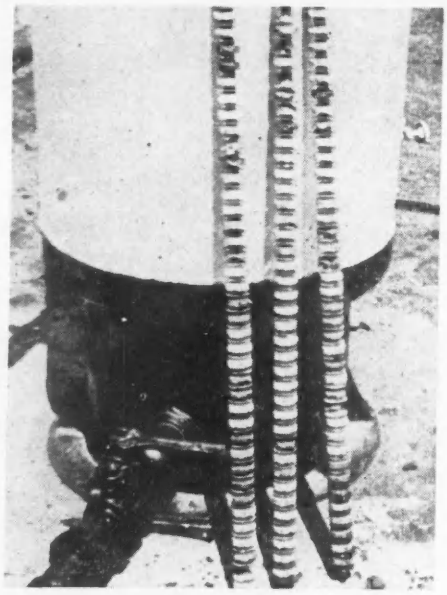
Referring to the former, especially where the treater unit is installed in an oil well or some of the surface equipment pertinent where there is a steady flow of fluid, the positive zinc ions attracted by the negative poles of the galvanic cell in the metal are constantly being washed off. This means that it is necessary to have a sufficient number of these zinc ions present in the fluid at all times to successfully combat the electrolytic corrosion present on the metal.

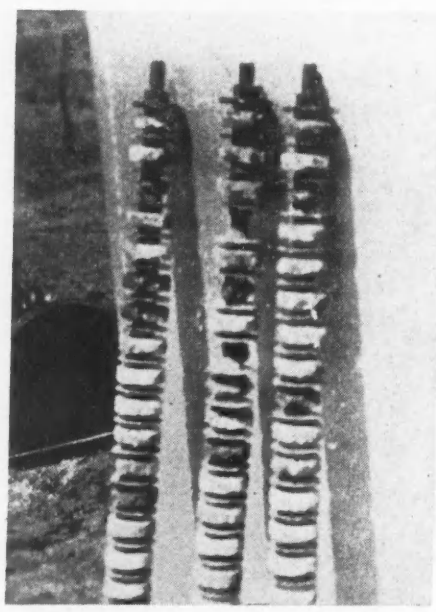
Experience obtained to date from a number of installations tends to indicate that this type of corrosion can be practically eliminated if sufficient treater strength is installed. However, on the other hand, where only a part of the treater strength necessary to eliminate the electrolysis present is installed, some reduction in the amount of the electrolytic corrosion can be expected.

This is clearly demonstrated by an installation made by one of the oil operators in the Signal Hill area of California. One treater unit was installed at first with almost immediate improvement noted in well conditions; however, electrolytic corrosion became more severe on the polish rod. Addition of two more units increased the useful life of a polish rod to four months.

This well produced from the Alamitos zone and had the reputation of being the most corrosive well in the area. Gross production was 450 barrels per day with a net of 35 to 40 barrels of 22-gravity crude. The water produced had a salt content of 2400 grams per gallon. Corrosive action was first observed as severe about January 1, 1945, and rapidly became worse. On February 21, a four-foot zinc collar was installed on the tubing near the pump. It was left in the well for a period of three months and although it was noted to be pitted and grooved upon inspection at frequent intervals, the collar did not seem to improve conditions and it was removed. On November 1, a four-foot treater unit was installed inside a 2½-inch sleeve directly below the pump in such a manner that all fluid entering the pump had to pass over the treater. Immediately an improvement was noticed as evidenced by the fact that during October . . . just prior to the installation of the treater . . . it became necessary to pull and repair the pump three times, whereas after running the treater the pump performed satisfactorily for two and one-half months. However, polish rod wear became more severe and replacement was necessary every 30 days. Two more treaters were added on January 11, 1946, making a total of three. This answered the polish rod problem, as the rod then installed remained in use for the next four months. All polish rods installed were of the same make and quality. A comparison of pump and tubing repair work for the ten months prior to the installation of the treater (January 1, 1945 to October 30, 1945), and for the eight months after installation (November 1, 1945 to June 30, 1946), is as follows:

Description of Work	Time—before and after installation	
No. of tubing and pump jobs—Total	17	4.0
No. of tubing and pump jobs—Avg. per mo.	1.7	0.3
No. of pump repair jobs—Total	10	4.0
No. of pump repair jobs—Avg. per mo.	1.0	0.5
No. of tubing leaks—Total	16	2.0
No. of tubing leaks—Avg. per mo.	1.6	0.24





Treater units used in scale removal and prevention work in the Slaughter pool, West Texas. Units had been installed in an oil treater four months previously.

It is the writers opinion that one treater unit should be installed in each well for every 175 barrels or fraction thereof of gross production, although the estimate could vary, depending on the salinity of the water. Treater units should be installed in wells producing waters containing salts and other minerals of a corrosive nature before the actual action of electrolysis is observed in order to save replacement of equipment.

The technique has also proved successful in wells in Kansas, West Texas and New Mexico where part of the corrosive action is due to hydrogen sulphide. However, sufficient temperature is an essential requirement under those conditions and a check on bottom-hole temperatures should always be made.

Two units were installed in the South Silica pool, Kansas, where the combination of electrolytic and sulphide corrosion is very severe. Prior to installation, pump runs averaged 30 days, rod breaks averaged about 15 days, and tubing leaks developed about once a month. After installation, the first tubing leak developed at the end of a 73-day run during which only one rod break was reported. The pump was found in excellent condition. In addition to furnishing protection over this run, there was sufficient zinc remaining on the treater units for several months of service.

The technique was successfully used in the McElroy pool of Southwest Texas where corrosive action is very severe and where average pump runs and the life of equipment are for too short for economic purposes. A treater unit was installed in one well which had been down 20 percent of the time because of pump trouble, rod breaks or tubing leaks. According to the latest available report this well, since the installation of a treater unit, produced without any down time for approximately six months, except for short intervals during which wornout cups were replaced.

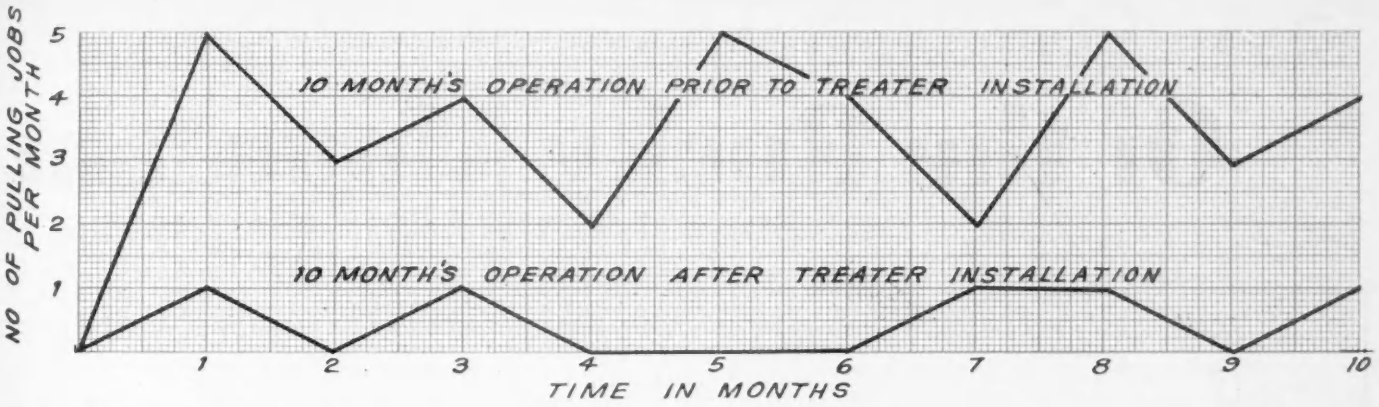
Another successful installation is reported from the Half-Way pool of New Mexico where electrolytic and sulphide corrosion caused rod breaks, tubing leaks and pump repair jobs at frequent intervals averaging from ten days to two weeks. As of November 1, 1946, this well had been on steady production for six months with only one shutdown for inspection.

Effective Life of Treater

The effective or protective life of a treater unit depends entirely on the rapidity of dissipitation of the zinc plates. This in turn is governed by bottom-hole temperature and the character of the fluid or electrolyte. Undoubtedly some units will afford effective protection longer than others. Results obtained to date indicate that the effective life of the average unit is 12 months. However, this does not imply that the entire unit must be scrapped, but only that the zinc plates which have been dissipated by the corrosive action of the fluid must be replaced.

In pumping wells, the treater units should be so installed that the well fluid (electrolyte) will enter the tubing string below them and flow up and around them before passing into the pump. The hookup installation is determined by the type of pump used.

Where an insert type pump is used


NO OF PULLING JOBS PER MONTH
10 MONTH'S OPERATION PRIOR TO TREATER INSTALLATION
10 MONTH'S OPERATION AFTER TREATER INSTALLATION
TIME IN MONTHS

Comparison of the number of pulling jobs on a pumping well in a very corrosive area during the period of ten months prior to the installation of treater units, and those in a similar period after their installation, based on results obtained.

with a bottom cup seating shoe and no tail pipe, the hookup is very simple, as the unit is attached to the bottom of the pump or the section holding the standing valve by means of a perforated adapter (Figure 2). Where a mechanical hold-down is used, an adapter such as shown in Figure 3 is required.

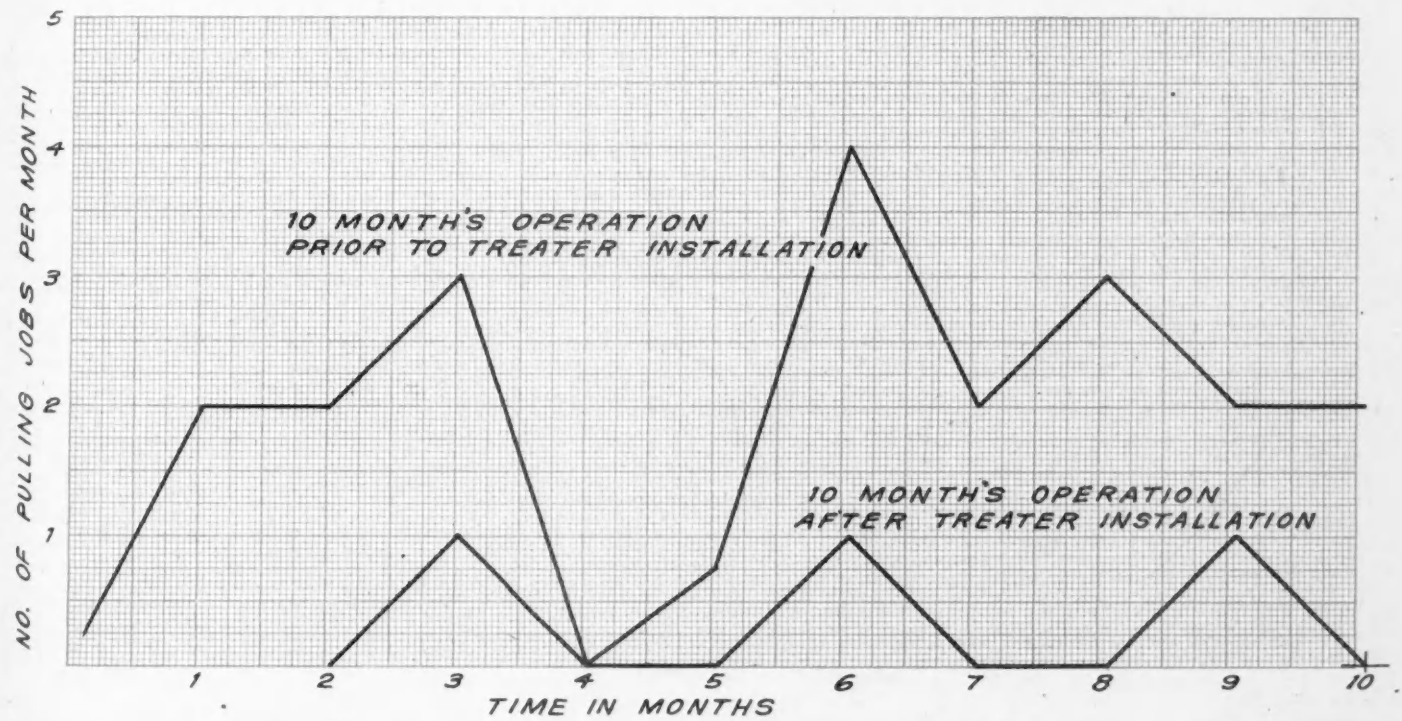
When it is necessary to run a gas anchor or tail pipe the body of the pump must be extended the length of the treater unit with the gas anchor shortened accordingly and connected below the treater. Also, whenever a top lock pump is used, the body of the pump must be extended to hold the unit or units so that the fluid will pass down along the pump and the section enclosing the unit or jacket then enter below and flow up around them into the pump.

To determine the number of units that should be installed for effective protection, the operator should have the bottom-hole temperature if the installation is for an oil well, or the temperature of the water and its corrosive strength if the units are to be installed in surface equipment.

It is essential that fluid temperature be at least 80° F., as zinc dissolves to an appreciable extent in warm fluids and since it is a case of getting enough zinc in solution to furnish the necessary protection, one unit might be sufficient at certain temperatures while more would be required at a lower temperature. The exact number of units required for a given volume of water in any specified area can be determined only by a test of the many variables present. It has been found that one units per 175 barrels of water produced or handled is sufficient in some areas, while in others one unit is required to handle any amount from one to 150 barrels. The degree of the corrosive action of the water, while very important in estimating the number of units required for any given installation, is most difficult to determine. It has been found that one barrel of very corrosive fluid produced or handled per day is more of a problem than 100 barrels whose corrosive action is only a fraction of that of the former.

Miscellaneous Uses

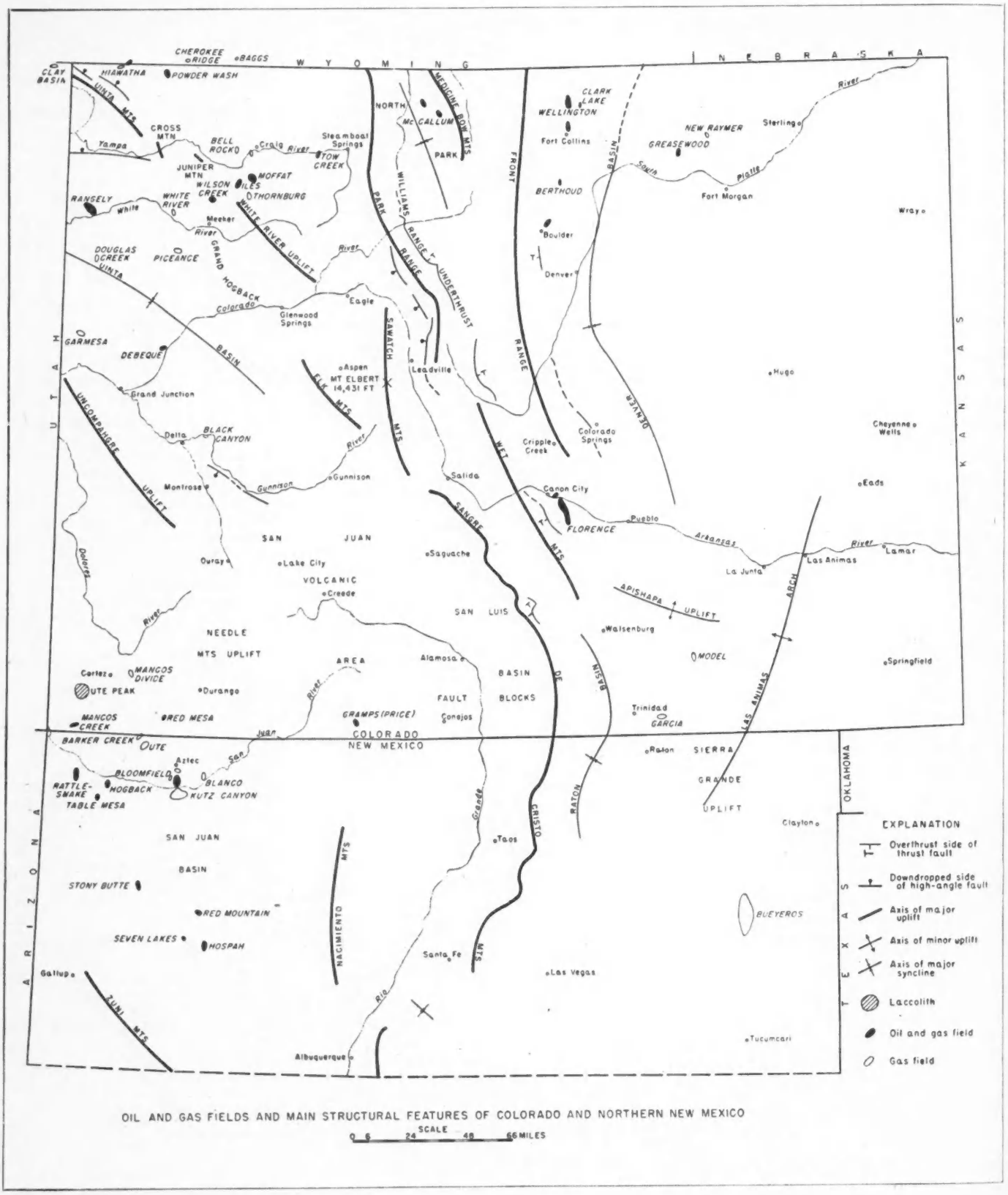
In addition to being installed in oil wells for combatting both electrolytic and sulphide corrosion, treaters have been installed in tank battery installations. Units are placed in the heater from where the protective coating can spread through the entire system. Another installation is that where units have been introduced into the vapor phase of a cooling coil where considerable electrolysis develops. From records compiled on the results obtained to date, it would appear that these treaters should furnish protection against these types of corrosion, not only in oil wells and tank batteries, but also in any vessel or container where fluid is being treated under temperature and pressure


NO. OF PULLING JOBS PER MONTH
10 MONTH'S OPERATION PRIOR TO TREATER INSTALLATION
10 MONTH'S OPERATION AFTER TREATER INSTALLATION
TIME IN MONTHS

Comparison of the number of pulling jobs on a pumping well in a combination corrosive area during the period of ten months prior to the installation of treater units, and those in a similar period after their installation, based on results obtained.

GEOLOGICAL FEATURES

Of the Rocky Mountain



Map and cross sections drawn from detailed base map by California Map & Blue Print Company, 1127 Story Building, Los Angeles.

Oil Region

By DR. C. E. DOBBIN
United States Geological Survey

ALTHOUGH the Rocky Mountain region has produced a relatively small amount of oil since the first well was completed there in 1862, it is of special interest for these reasons: Many different kinds of oil have been produced from strata ranging in age from lower Mississippian to Oligocene; strong showings of oil have been found in several pre-Mississippian series; the oldest oils tend to be heavy and the youngest oils light; oil and gas occur in almost all known types of traps; beds in several series often yield oil and gas in one field; some of the natural gases are rich in helium and carbon dioxide; and the producing beds are exposed rather closely to the oil and gas fields.

The first oil well in the region was completed on the bank of Oil Creek, about six miles northeast of Canon City, Colo. The wells found oil in fractured shale at 60 to 90 feet. The oil was crudely refined and sold in Denver and elsewhere in the territory.

Diligent search for oil and gas in the region on the basis of the anticlinal theory of accumulation began about 1912 and most of the oil fields were discovered during the years 1919, 1923, and 1924.

The lowest surface altitude in a Rocky Mountain oil or gas field is about 2160 feet in the Bowdoin gas field, Montana, and the highest is about 8000 feet in the Wilson Creek, McCallum, and Gramps (Price) fields, Colorado. The highest point (14,431) in the region is Mt. Elbert, Colorado, and the lowest (about 850 feet) is where the Colorado River leaves Arizona.

About one third of the oil and gas fields in the region are in the Great Plains, about half in the Rocky Mountain system, and the remainder in the Colorado Plateaus.

Colorado Plateaus: Although the strata in the Colorado Plateaus are mostly either flat or gently tilted, there are some broad uplifts and downwarps, such as the Zuni, Defiance, Uncompahgre, and San Rafael Swell uplifts—all rejuvenated—and the Uinta, San Juan, and Black Mesa structural basins, together with lesser upwarps, downwarps, abrupt monoclines, linear zones of faulting and lofty laccoliths. The western border of the plateaus is featured by the north-south trending zone of normal faults bordering on the Great Basin.

Principal Oil and Gas Fields

In Montana, most of the oil fields lie on the Sweetgrass arch, the largest ones being Kevin-Sunburst, Cut Bank, and Pondera. Elsewhere in the state, Cat Creek and Dry Creek yield relatively large quantities of oil, and Bowdoin and Cedar Creek (Baker-Glendive) yield gas.

In Wyoming, most of the oil and gas fields are on the rims of major structural basins, the prominent exception being Baxter Basin on the relatively low Rock Springs uplift in the Green River Basin.

In the Big Horn Basin, the principal oil fields are Grass Creek, Oregon Basin, Elk Basin, Little Buffalo Basin, Garland, Frannie, Byron and Gebo; those in the Powder River Basin are Salt Creek, Lance Creek, Big Muddy, and Osage; those in the Wind River Basin are Maverick Springs, Big Sand Draw, Steamboat Butte, and Pilot Butte; those in the Laramie Basin are Rock Creek and Medicine Bow; and those in the Green River Basin are Lost Soldier, Wertz, and La Barge. Important gas fields are Baxter Basin, Big Sand Draw and Muskrat.

In Colorado, most of the important oil fields are in the northwestern part of the state, including Iles, Moffat, Tow Creek, Wilson Creek and Rangely. Elsewhere are the relatively small Florence, Fort Collins, Gramps (Price), and Wellington fields.

In Northern New Mexico, all the oil and most of the gas fields are in the San Juan Basin in the northwestern corner of the state, Rattlesnake being the largest oil field and Ute and Kutz Canyon being the largest gas fields. The Bueyeros and other areas in the northeastern part of the state yield gas rich in carbon dioxide.

Utah has several relatively small gas fields and the very small Virgin oil field.

Northern Arizona and Southeastern Idaho have no oil or gas fields.

Origin of Oil and Gas Traps

Practically all oil and gas traps in the region were formed by Laramide orogeny. That at least one large trap (Kevin-Sunburst dome) is rejuvenated; that some resulted from igneous intrusions; that others were made by peculiar and puzzling forms of thrust faulting; and that the large majority are subordinate to major uplifts is clear—all occurring in a region of varied orogenic history now welded into one morphologic unit.

Because of the rather small areas of most producing oil and gas traps and as little or no deep drilling has been done in contiguous structural basins, the geological data essential to determine the detailed structural history of most traps are largely lacking.

Rejuvenated traps: The Sweetgrass arch, Montana, is the only important area in the region where oil and gas accumulation is known to be directly related to pre-Laramide folding. North of Missouri River, the arch is superimposed upon a long, broad upfold developed in the Carboniferous, which parallels the present Rocky Mountain Front from Great Falls, Mont., northward beyond Calgary, Alberta. The lines of weakness engendered by the development of this arch . . . the Calgary-Great Falls arch . . . localized the position of Kevin-Sunburst dome and South arch, both of which form the Sweetgrass arch and are featured by minor cross-folds. However, the lack of evidence of strong compressive folding over the main part of the Sweetgrass arch suggests that its present form resulted largely from dominantly vertical forces during Laramide orogeny.

Tertiary igneous intrusions: Whitlash and Flat Coulee domes and the Bears Den structural nose on the north flank of the laccolithic Sweetgrass Hills, Montana, were probably developed by or are closely related to igneous intrusive masses of the Hills, probably resulting from upthrusts of deep-seated igneous plugs. That the broad Bowdoin gas dome in Northeastern Montana is also of deep-seated igneous origin is strongly indicated by its general shape, by association with other known igneous features in the zone of igneous mountains featuring Northern Montana east of Sweetgrass arch, by the positive gravity anomaly near Hinsdale, by the hot water in the dome at a depth of about 3200 feet, and by a geothermal gradient about 50 percent greater than at Kevin-Sunburst dome.

Thrust-faulted traps: Outcrops in the peculiar shallow thrust-fault zone surrounding the Bearpaw Mountains in North Central Montana, and extending

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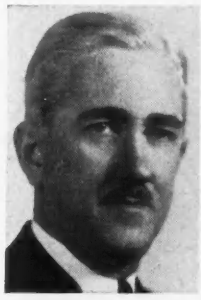
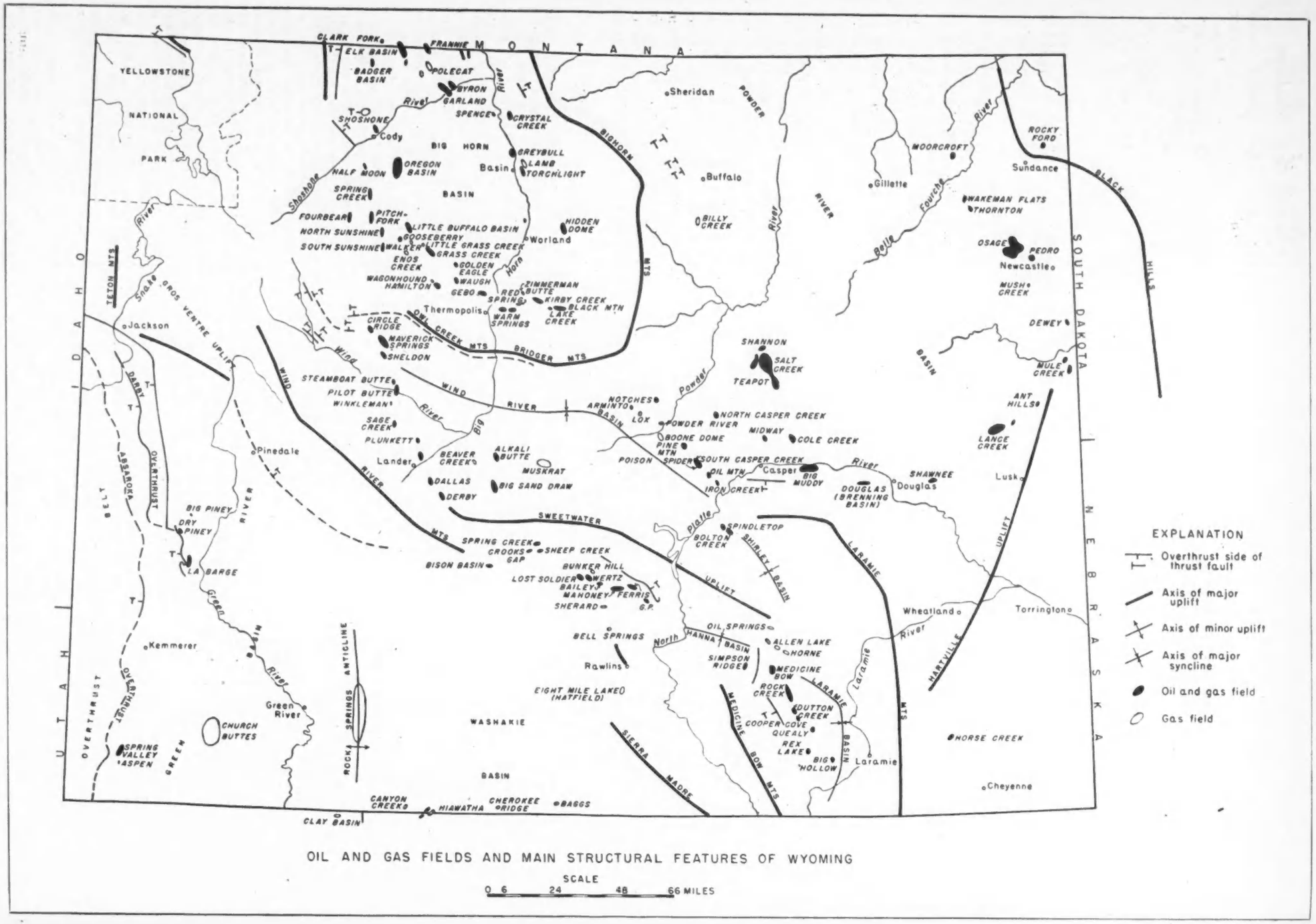
Carroll E. Dobbin, United States Geological Survey, Denver, was born in Jonesport, Maine, October 2, 1892. He received the degree of B.A. at Colby College in 1916 and a Ph.D. in geology at Johns Hopkins University in 1924. In 1941, Colby awarded him an honorary degree of D.Sc. He has been a geologist in the Survey since 1918, specializing in structural geology and the geology of petroleum and coal in the west.



Carroll E. Dobbin

"Who's Who in America" lists Dr. Dobbin as president of the Colorado Engineering Council—the coordinating body for all engineering societies in Colorado—and as a member of other professional societies, as follows:

American Association of Petroleum Geologists (vice president 1936-37); Geological Society of America; American Institute of Mining and Metallurgical Engineers (vice chairman Colorado section); AAAS; Colorado Scientific Society (secretary); Geological Society of Washington; American Geophysical Union; Sigma Xi; and Gamma Alpha. He is also a director of the Colorado Society of Engineers.



OIL AND GAS FIELDS AND MAIN STRUCTURAL FEATURES OF WYOMING

southwestward to the Highwood Mountains, are largely horizontal, weak, Upper Cretaceous strata, that locally are buckled in a series of long, narrow anticlines, many of which have complex shallow thrust fault relations involving only Upper Cretaceous beds and some of which contain gas. The fault pattern suggests that the faulted anticlines were formed during the middle Tertiary epoch of volcanic activity in the Bearpaws by the compression of formations in the upper part of the Colorado shale while moving plainsward.

Subordinate traps: The northernmost producing traps in the region that are clearly subordinate to a major uplift are West and Mosby domes on the Cat Creek anticline, Montana, which forms the northeastern border of the Big Snowy anticlinorium. Although the extreme northwestern part of the anticlinorium is of laccolithic origin, the great thinning of Upper Cretaceous shale formations on the flanks of West, Mosby and other unproductive domes, suggests that all other structures in the anticlinorium were formed by unequal tangential compression.

Some of the small producing traps in Southern Montana . . . Dry Creek, Big Lake, and Mosser domes . . . are in an area of block elevation, rotation, faulting and thrusting, dominated by the Pryor and Beartooth Mountains and the Lake Basin fault zone. Soap Creek dome and Hardin structural terrace are subordinate to the Big Horn Mountains unlift, and the Cedar Creek (Baker-Glendive anticline is seemingly an offset continuation of the Black Hills uplift, in which block elevation and rotation have played a relatively large role.

With few exceptions, such as the Baxter Basin and the La Barge domes, Wyoming, the Virgin monocline, Utah, the Bueyeros domes, New Mexico, and the Greasewood anticline and the Florence monocline, Colorado, the producing traps in the region south of Montana seem clearly satellite to major uplifts. As the subordinate traps are on the peripheries of major structural basins, it is believed that they were formed progressively from areas of maximum stress intensity . . . the major uplifts . . . toward areas of less stress intensity . . . the structural basins . . . as suggested by the rows of mountainward, intermediate, and basinward anticlines in the Big Horn Basin, Wyoming. Many of the asymmetrical, steep-sided anticlines in Wyoming and Northern Colorado have been classified as overthrust and underthrust types.

Age of Oil and Gas Zones

Pre-Carboniferous zones: Although oil occurs in outcrops of pre-Cambrian granite, gneiss, and other rocks at widely separated localities in the region, most of it in such rocks apparently comes from younger beds beneath thrust faults. Showings of oil have been reported in Cambrian beds in a few scattered wells, in Devonian beds on the Sweetgrass arch, and in Ordovician beds at Cedar Creek (Baker-Glendive), Montana.

Carboniferous and Permian zones: The Madison limestone, of lower Mississippian age, is the oldest proved commercial oil and gas zone in the region, yielding relatively large amounts of oil at Kevin-Sunburst and Pondera, Montana, and at Garland, Wyoming. Other fields either producing or capable of producing oil from the Madison in varying amounts are Twin Rivers (Reagan), Montana, and Oregon Basin, Frannie, and Red Springs, Wyoming. In the small Devils Basin field, Montana, a little black oil is produced intermittently from the Van Duzen sand in the Big Snowy group (late Mississippian), and some Mississippian oil was found in wells at Cedar Creek (Baker-Glendive) anticline, Montana.

Most of the Pennsylvanian oil produced in the region comes from the Tensleep sandstone in Wyoming. The Minnelusa sandstone of Eastern Wyoming . . . an indeterminate part of which is Tensleep . . . yields large amounts of oil at Lance Creek, and smaller quantities at Dewey and East and West Mule Creek. Pennsylvanian oil also occurs in the Amsden formation at Gage and Soap Creek, Montana, in the Weber sandstone at Rangely, Colorado, in the Hermosa formation at Rattlesnake, New Mexico, and in the old San Juan field, Utah.

The Embar formation of Permian age yields commercial amounts of oil at many localities in the Big Horn and Wind River basins, Wyoming, and the Coconino sandstone, of the same age, has yielded gas containing 1.31 percent helium at Woodside, Utah. In the old San Juan field, Utah, the Permian Rico formation yielded a little oil.

Triassic, Jurassic, and Cretaceous zones: The Chugwater formation, of Permian and Triassic age, yields small amounts of black oil at Grass Creek, Hamilton dome, Sage Creek, and Ferris, Wyoming, and the Santa Rosa (?) sandstone, of upper (?) Triassic age, yields relatively pure carbon dioxide gas in the Bueyeros area, New Mexico. At Virgin, Utah, small amounts of oil have been produced from basal limestones of the Lower Triassic Moenkopi formation.

The Upper Jurassic Ellis formation yields oil and gas on and near the Sweetgrass arch, Montana, and the Sundance formation, of the same age, yields large amounts of both in a belt, about 100 miles wide, trending northeast-southwest across Southeastern Wyoming into Northwestern Colorado.

The Upper Jurassic Morrison formation yields oil and gas in a few scattered fields. At Garmesa, Colorado, the Morrison and subjacent formations yield gas containing from 20 to 61.05 percent carbon dioxide, and at Harley, Utah, Morrison gas contains 7.16 percent helium.

Cretaceous sandstones are the most widespread oil and gas zones in the region, producing either one or both in at least 121 fields.

Tertiary zones: Eocene oil has been found only in the irregular, coarse, nonmarine sands of the Wasatch formation at La Barge, Wyoming, and at Hiawatha and Powder Wash, Colorado.

In the old Douglas (Brenning Basin) field and near Shawnee, Wyo., minor amounts of oil and gas have been found at shallow depths in lenticular sands and conglomerates at or near the base of the overlapping White River formation, of Oligocene age.

The small amounts of oil found in Tertiary basalt dikes in parts of Colorado were probably distilled by heat from organic matter in enclosing marine shale.

Character of Oil and Gas Zones

In limestone, production is found in porous, dolomitic zones at and near weathered surfaces (Madison, at Kevin-Sunburst), in similar but unweathered zones deep within limestone (Madison, at Garland), and in assemblages of porous, granular dolomite, coarse chert with a matrix of shaly limestone, and fairly loose residual sandstone (Embar, of Wyoming). The porosity in limestone may range from average to "tight" in one field.

The marine Tensleep sandstone of Wyoming, which yields most of the Paleozoic oil from sandy beds in the region, is a light-colored, fine-grained, cross-bedded, quartzitic sandstone that seemingly is very porous. Actually, however, large portions of it are so tightly cemented that oil and water do not separate on a uniform water table, causing the unusual condition of water occurring higher in an upfold than oil. On the contrary, the prolific Sundance (Upper Jurassic) sand in Wyoming and Northwestern Colorado is a pure, crossbedded, ordinarily soft, marine sandstone with uniform porosity.

Most Cretaceous zones are irregular, medium-grained to conglomeratic, lenticular sheet sandstones ranging from 12 to 20 percent in porosity and from 20 to 250 millidarcys in permeability, the conglomeratic facies occurring mostly in Lower Cretaceous formations. Fissures in marine shale yield oil in many fields that also produce from consolidated beds and in a few other fields are the only productive zones.

Tertiary zones are irregular, lenticular, fluviatile and lacustrine porous sandstone.

Although the initial porosity in the sandstones may have been rather high, appreciable reduction of both porosity and permeability undoubtedly has occurred in many sandstones because of the precipitation of quartz, dolomite, calcite and anhydrite. In fact, portions of some sandstones that are porous producers in one place may be without pore space locally elsewhere, the grains having been completely cemented.

Quality of the Oil

Oils in the region range in gravity from 75 to 11 and vary in color from clear to glossy black through various shades of amber, green, and brown. Some are solid at 90° F., and others are liquid at —50° F., and the sulphur content varies from a trace to more than 4 percent. Here, as elsewhere, oils are called light or heavy, according to gravity, sweet or sour, according to sulphur content, and green or black, according to color.

Most of the oil from Paleozoic beds in the region is black, low in gravity, and relatively high in sulphur, the prominent exceptions being that from the Minnelusa sandstone at Lance Creek, Wyoming, from the Tensleep sandstone at Wertz, Big Sand Draw, and Lost Soldier, Wyoming, and from the Hermosa formation at Rattlesnake, New Mexico.

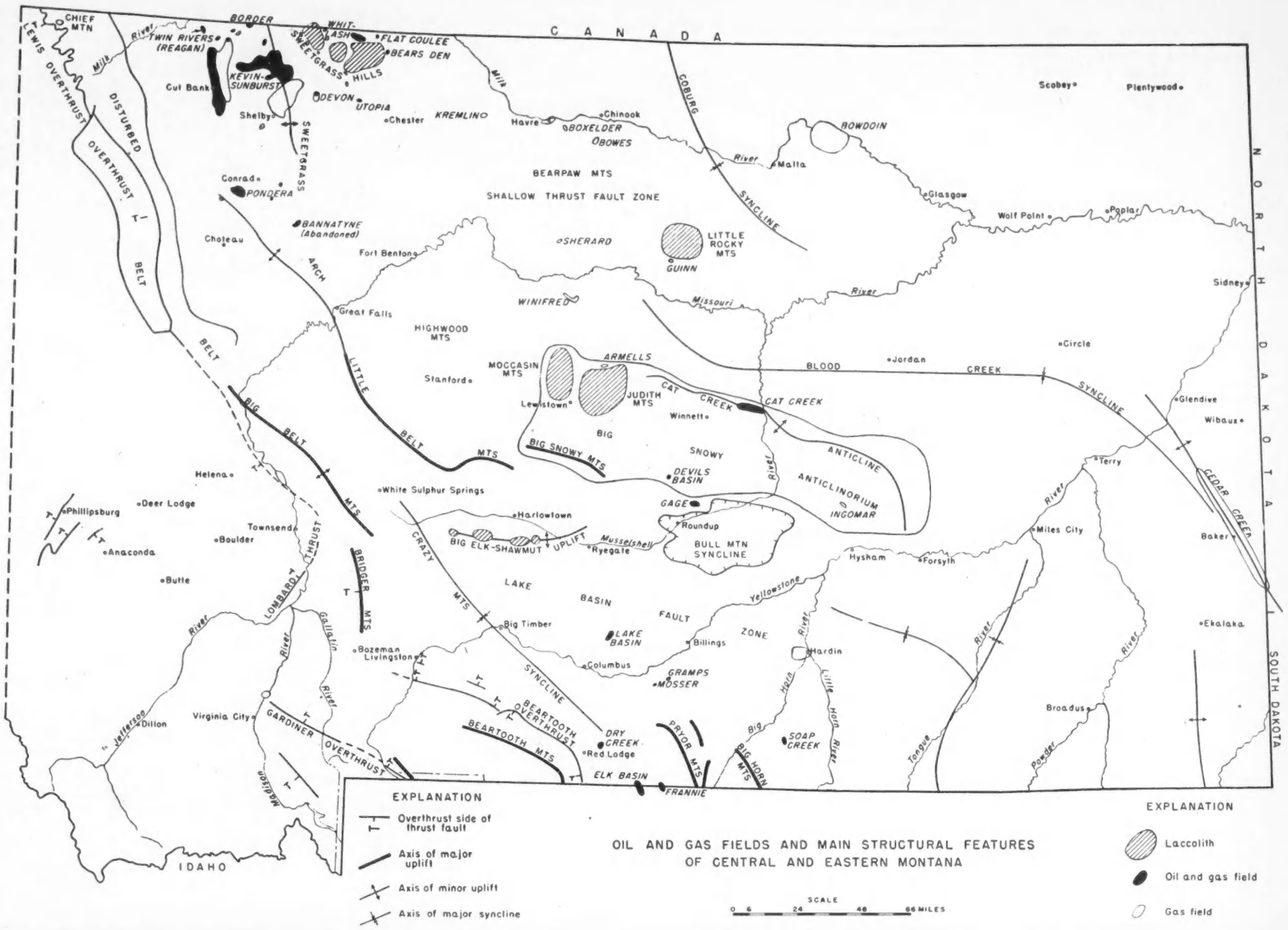
Although small amounts of low-gravity, black oil have been found in Mesozoic beds at scattered localities in the region, almost all the oil from that series is relatively high-gravity and green, the lightest being the 75-gravity oil from the Dakota sandstone at Rattlesnake, New Mexico, which weathers to about 63-gravity in 24 hours.

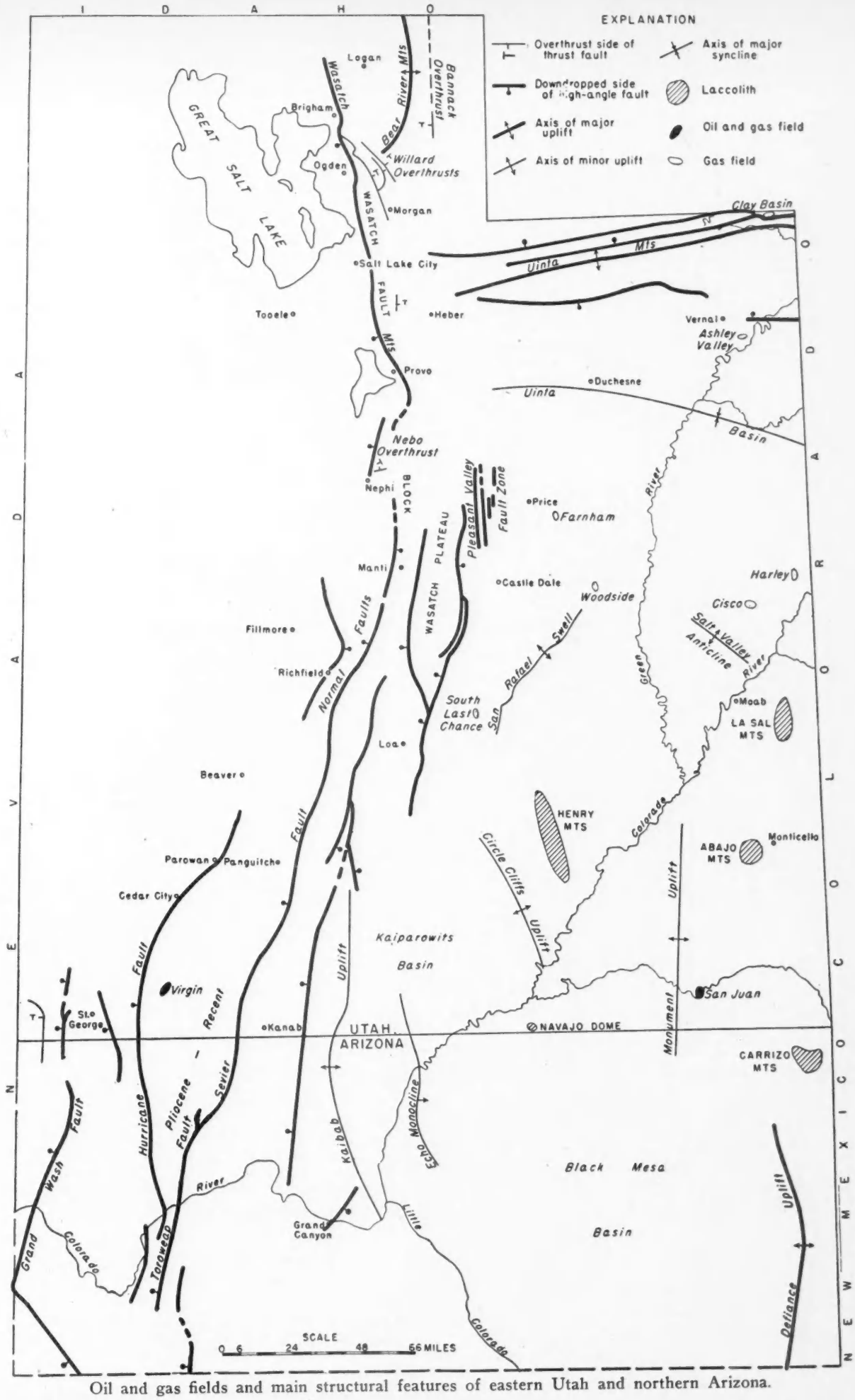
The oil produced from the Eocene Wasatch formation at Powder Wash, Colorado, and near-by Hiawatha ranges from 36 to 48 gravity, and that from Eocene sandstones at La Barge, Southwestern Wyoming, from 20 to 46.

The quality of the oil in the region

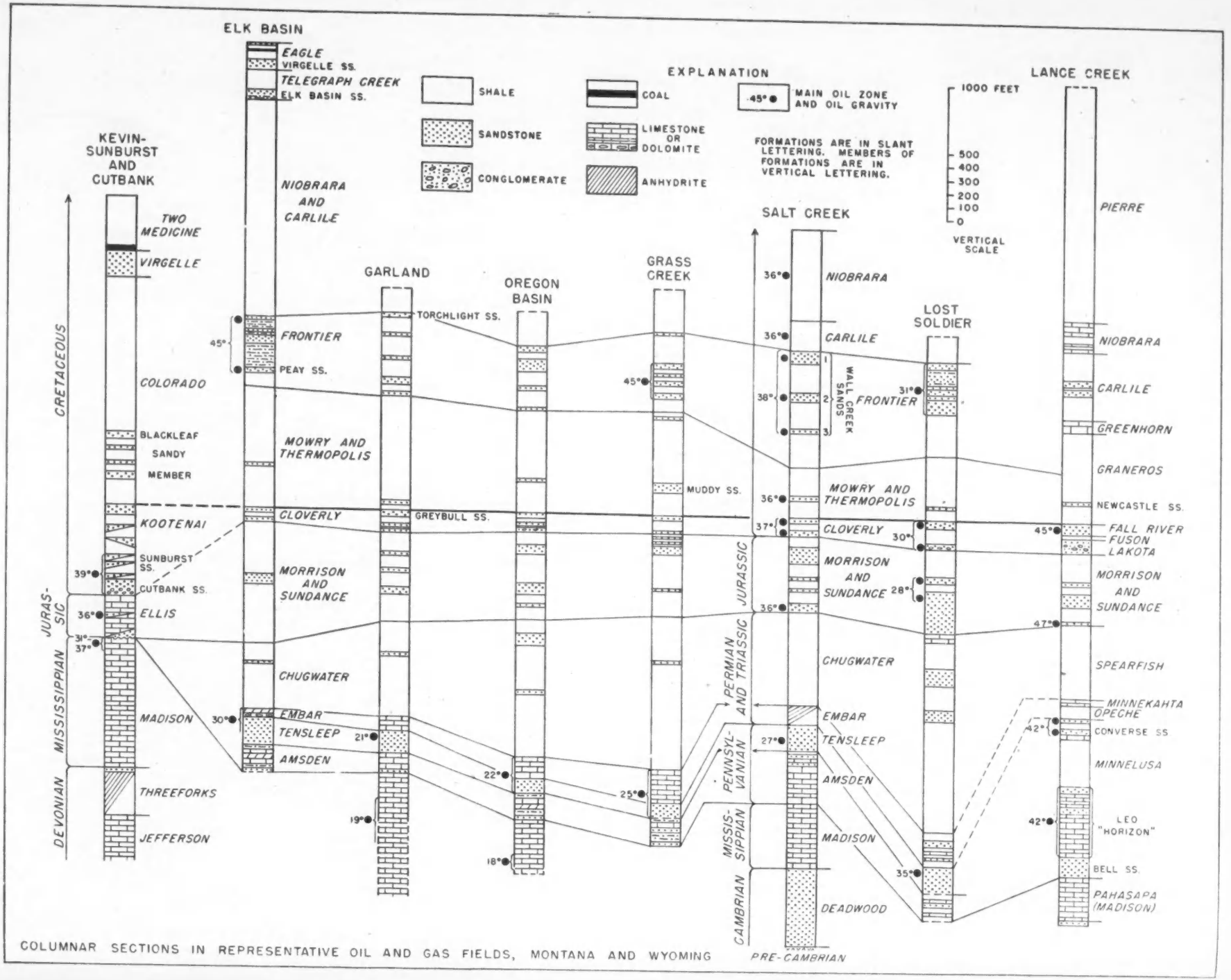
■ CONTINUED ON PAGE 30

ALSO SEE MAPS AND CROSS-SECTION ON 26, 27, 28, 29.

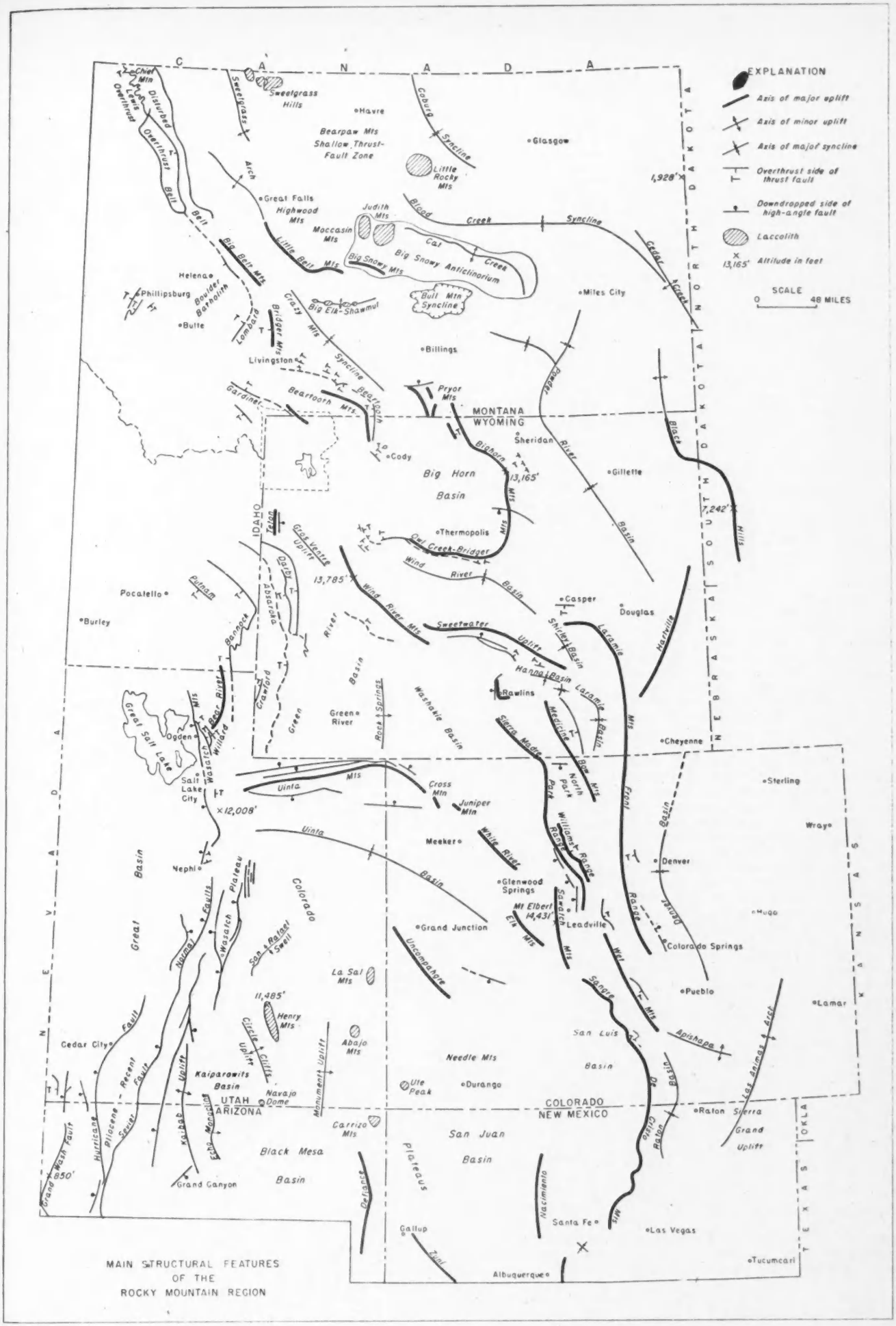

CANADA
NORTH DAKOTA
SOUTH DAKOTA
IDAHO
CHIEF MTN
LEWIS OVERTHRUST
DISTURBED BELT
OVERTHRUST BELT
BORDER
TWIN RIVERS (REAGAN)
KEVIN-SUNBURST
WHITLASH
SWEETGRASS HILLS
FLAT COULEE
BEARS DEN
Cut Bank
Shelby
SWEETGRASS ARCH
DEVON
UTOPIA
Chester
KREMLINO
Havre
BOXELDER
OBOWES
Chinook
COBURG SYNCLINE
BOWDOIN
Malta
Scobey
Plentywood
Glasgow
Wolf Point
Poplar
Sidney
Circle
Jordan
Glendive
Wibaux
Terry
Miles City
Baker
Ekalaka
Broadus
Hysham
Forsyth
Hardin
Billings
Conrad
PONDERA
BEARPAW MTS
SHALLOW THRUST FAULT ZONE
BANNATYNE (Abandoned)
Choteau
Fort Benton
SHERARD
LITTLE ROCKY MTS
GUINN
WINIFRED
Missouri River
Great Falls
HIGHWOOD MTS
LITTLE BELT MTS
BIG BELT MTS
MOCCASIN MTS
Stanford
ARMELLS
JUDITH MTS
CAT CREEK
BLOOD CREEK SYNCLINE
Lewistown
Winnett
BIG SNOWY MTS
BIG SNOWY DEVILS BASIN
ANTICLINE
ANTICLINORIUM
INGOMAR
GAGE
Roundup
Helena
White Sulphur Springs
Harlowtown
BIG ELK-SHAWMUT UPLIFT
Musselshell
Ryegate
BULL MTN SYNCLINE
Phillipsburg
Deer Lodge
Townsend
Boulder
Anaconda
Butte
LOMBARD THRUST
BRIDGER MTS
CRAZY MTS
LAKE BASIN FAULT ZONE
Big Timber
LAKE BASIN
Bozeman
Livingston
Columbus
GRAMPS
MOSSER
Yellowstone River
Big Horn River
Little Horn River
Tongue River
Powder River
Cedar Creek
Gallatin River
Jefferson River
Dillon
Virginia City
GARDINER OVERTHRUST
MADISON
SYNCLINE
BEARTOOTH OVERTHRUST
BEARTOOTH MTS
DRY CREEK
Red Lodge
ELK BASIN
FRANNIE
PRYOR MTS
BIG HORN MTS
SOAP CREEK
EXPLANATION
Overthrust side of thrust fault
Axis of major uplift
Axis of minor uplift
Axis of major syncline
OIL AND GAS FIELDS AND MAIN STRUCTURAL FEATURES OF CENTRAL AND EASTERN MONTANA
SCALE
0 6 24 48 66 MILES
EXPLANATION
Laccolith
Oil and gas field
Gas field



Oil and gas fields and main structural features of eastern Utah and northern Arizona.



COLUMNAR SECTIONS IN REPRESENTATIVE OIL AND GAS FIELDS, MONTANA AND WYOMING


CANADA
EXPLANATION
Axis of major uplift
Axis of minor uplift
Axis of major syncline
Overthrust side of thrust fault
Downdropped side of high-angle fault
Laccolith
13,165' Altitude in feet
SCALE 0 48 MILES
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLA
TEXAS
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
Chief Mtn
Lewis Overthrust
Disturbed Belt
Overthrust Belt
Sweetgrass Hills
Havre
Bearpaw Mts Shallow Thrust-Fault Zone
Coburg Syncline
Glasgow
1,928'
Little Rocky Mts
Great Falls
Highwood Mts
Judith Mts
Moccasin Mts
Blood Creek Syncline
Cedar Creek Anticline
Big Belt Mts
Little Belt Mts
Big Snowy Mts
Big Snowy Anticlinorium
Cat Creek
Helena
Phillipsburg
Boulder Batholith
Butte
Bull Mtn Syncline
Miles City
Big Elk-Shawmut
Crazy Mts
Bridger Mts
Livingston
Billings
Gardiner
Beartooth Mts
Beartooth Fault
Pryor Mts
Sheridan
Bighorn Mts
13,165'
Cody
Big Horn Basin
Gillette
Black Hills
7,242'
Thermopolis
Owl Creek-Bridger Mts
Wind River Basin
Wind River Mts
13,785'
Casper
Douglas
Pocatello
Burley
Sweetwater Uplift
Shirley Basin
Laramie Basin
Hanna Basin
Rawlins
Green River Basin
Rock Springs
Washakie Basin
Great Salt Lake
Ogden
Salt Lake City
×12,008'
Uinta Mts
Cross Mtn
Juniper Mtn
Uinta Basin
Meeker
White River
Glenwood Springs
Grand Junction
Mt Elbert 14,431'
Leadville
Colorado Springs
Denver
Cheyenne
Sterling
Wray
Hugo
Pueblo
Lamar
Nephi
Wasatch Plateau
Wasatch Faults
Colorado
San Rafael Swell
La Sal Mts
11,485'
Henry Mts
Circle Cliffs Uplift
Abajo Mts
Needle Mts
Ute Peak
Durango
Cedar City
Fault
Recent Fault
Kaiparowits Basin
Navajo Dome
Monument Uplift
Kaibab Uplift
Echo Monocline
Carrizo Mts
Black Mesa Basin
Grand Canyon
Grand Wash Fault
Hurricane
Pliocene
Sevier
Paradox Basin
San Juan Basin
Plateaus
Defiance
Zuni
Gallup
Santa Fe
Las Vegas
Albuquerque
Tucumcari
Raton
Sierra Grande Uplift
Las Animas Arch
Apishapa
Sangre de Cristo Mts
San Luis Basin
Raton Basin
Front Range
Park Range
North Park Basin
Medicine Bow Mts
Sierra Madre
Laramie Mts
Hartville
Owl Creek Mts
Casper Arch
Gas Ventre Uplift
Darby Thrust
Absaroka Thrust
Crawford Thrust
Putnam Thrust
Bannock Thrust
Willard Thrust
Paris Thrust
Willis Thrust
MAIN STRUCTURAL FEATURES OF THE ROCKY MOUNTAIN REGION

■ CONTINUED FROM PAGE 25

has no demonstrable relation to dynamic metamorphism. In some anticlines green oil is yielded by Cretaceous and Jurassic sandstone and black oil by Paleozoic sandstone and limestone. Some sharply folded anticlines contain oil of 11 gravity and higher in Paleozoic beds and others with gentler dips contain 28 to 45 gravity oil in the same beds.

It is evident, therefore, that in addition to metamorphism other factors are responsible for the quality of the oil, such as differences in origin, weathering, natural processes of refining or filtration, deterioration as a result of contact with sulphate-bearing waters, and other unknown changes during and after accumulation.

In the Uinta Basin, many asphaltic substances, such as uintaite (gilsonite), wurtzilite, ozokerite, nigrite (albertite), tabbyite, maltha, and an enormous tonnage of oil-saturated sandstones, occur in Tertiary sandstone. Gilsonite, which probably is the most important of these substances in the basin, occurs in vertical dikes or veins that are nearly parallel.

Rich Carbon-Dioxide and Helium Natural Gases

In parts of Northeastern and North Central New Mexico, wells yield relatively large amounts of gas containing almost pure carbon dioxide from late Paleozoic and early Mesozoic beds. In the Bueyeros field, Harding County, the gas is 99.4 to 99.9 percent pure carbon dioxide. The depth to the gas zone is 650 to 2100 feet and the potential output is reported to be 25 million cubic feet daily. Other areas in Northern New Mexico that contain rich carbon dioxide gas are the Estancia field, Torrance County; Jaritas dome and near Maxwell, Colfax County; Wagon Mound anticline, Mora County; and the Sierra Grande uplift, Union County.

In the McCallum (Walden) field, Colorado, the Upper Cretaceous Dakota sandstone yields gas containing about 94 percent carbon dioxide, the average initial production of single wells being about 35 million cubic feet daily. Other places in Colorado that yield rich carbon-dioxide gas in wells are Garmesa dome, Garfield County, and localities in Las Animas, Delta, and Montrose counties.

In Utah, gas containing as much as 98.3 percent carbon dioxide is produced from Permian sandstone at Farnham dome, and similar gas has been found in wells at several isolated localities in the southeastern part of the state.

In Montana, large volumes of carbon-dioxide gas have been found in Devonian beds at Kevin-Sunburst.

The rich carbon dioxide gases from hot springs, fumaroles, and mineral springs in Yellowstone National Park, and elsewhere, are the result of volcanic and chemical activity. Similar gas in wells, however, may be the result of the intrusion of limestone by magmas or the action of acid waters on limestone.

Model dome, Las Animas County, Colorado, yields natural gas containing about 7.0 percent helium and 81 percent nitrogen from early Mesozoic beds. However, the open flow of single wells is small and the rock pressure is very low.

Woodside dome, Emery County, Utah, yields gas containing 1.31 percent helium from Permian sandstone, and Harley dome, Grand County, yields gas containing 7.16 percent from Jurassic sandstone.

Rattlesnake dome in northwestern New Mexico yields rich helium gas from the Ouray-Leadville limestone sequence, which may be of Devonian or Mississippian age.

Less than 1.0 percent of helium occurs in gas from Upper Cretaceous, Mississippian, and Cambrian beds in the Havre, Pondera, and Kevin-Sunburst fields, respectively, Montana.

The Dakota (?) sandstone in the Baxter Basin field, Sweetwater County, Wyoming, yields gas containing 0.86 percent helium.

The fact that many natural gases containing noteworthy amounts of helium occur in reservoirs relatively close to the basement rocks suggests that the helium in some natural gases, at least, has resulted from the disintegration of radioactive elements in those rocks.

Oil Shale

In the Rocky Mountain region many different carbonaceous materials from which oil may be distilled occur widely in post-Ordovician beds, but by far the richest and most extensive deposits are in the Green River formation, of middle Eocene age, in Colorado, Utah and Wyoming. Even the richest of these so-called oil shales yield only a very small amount of free oil when treated with hydrocarbon solvents, but when heated, yield oils very similar to petroleum in the form of vapors, which may be condensed into oil. Because of their richness, thickness, and nearness to a railroad, the almost horizontal oil-shale beds of the Green River formation exposed in the vicinity of Parachute and Roan creeks, near Grand Valley and De Beque, Colo., are the most valuable in this country.

The Green River formation is a series of almost horizontal beds deposited in ancient lakes, which seemingly always had extraordinarily large areas compared with their depths. The sediments of the Green River formation of Colorado and Utah accumulated in ancient Uinta Lake and those of Wyoming in the contemporary Gosiute Lake. The average thickness of the Green River formation in Colorado and Utah is about 2000 feet. East of Bitter Creek, Utah, which is in the eastern part of the Uinta Basin, the parachute Creek member of the Green River formation contains most of the rich oil-shale beds, being featured by the "mahogany ledge," which is the principal oil-shale zone of that formation. Most rich beds of oil shale in the Green River formation are more or less magnesian marlstones rich in organic matter.

It has been estimated that if 60 percent of the total shale in Northwestern Colorado existing in the ground as beds three feet or more thick and yielding at least 15 gallons of oil to the ton were treated in retorts it would produce a total of 40,640,000,000 barrels (42 gallons each) of crude shale oil.

Types of Traps

About 57 percent of the oil and gas fields in the region are anticlines and domes thereon whose productive areas are either not faulted or only slightly faulted at the surface; about 26 percent are faulted anticlines and domes, and fault blocks; about 14 percent are monoclines and structural terraces; and about 3 percent are plunging anticlines and structural noses.

About 25 percent of the oil and gas fields in the region are relatively important producers. About half of these are on unfaulted anticlines and domes, slightly less than half are on faulted anticlines and domes, and the remainder are on monoclines and structural terraces.

Unfaulted anticlines and domes: Only three unfaulted traps in Montana are of relative economic importance; namely, Kevin-Sunburst, Bowdoin, and Cedar Creek (Baker-Glendive), the last two producing gas from upper Cretaceous sandstones.

Bowdoin dome is the largest producing trap in the region, being a very broad, low, almost circular uplift about 66 miles long and 62 miles across at the widest place with a total regional structural closure of about 700 feet. The central part of the dome has two "highs," each having about 100 feet of closure.

The other unfaulted producing traps in Montana range in structural definition from low folds with less than 125 feet of structural closure, such as Bannatyne, Flat Coulee, and Big Lake, to sharp, well-defined domes with relatively large structural closure; namely, Whitlash (500 feet) and Soap Creek (800 feet).

In Wyoming, oil and gas have been produced in varying amounts from about 65 unfaulted or slightly faulted anticlines and domes that range to the extreme in shape, size and amount of structural closure. There are gentle, low domes, such as Badger Basin, Golden Eagle, Billy Creek, East Mule Creek, and others; there are simple, asymmetric, elongated anticlines, such as Rock Creek; there are broad, oval-shaped anticlines, such as Mahoney; there are asymmetrical domes with relatively large amounts of structural closure; for example, Medicine Bow (2900 feet), Little Buffalo Basin (1600 feet), Shoshone (1400), Grass Creek (2400), and others; there are narrow, asymmetrical anticlines with small amounts of structural closure, such as Kirby Creek; and there are overturned anticlines, such as Lander (Hudson). Almost half of the relatively large and important fields in the state are on unfaulted or slightly faulted anticlines and domes.

Well more than half of the known producing traps in Colorado are unfaulted or slightly faulted anticlines and domes. About one third of these are on very low anticlines, and three . . . Moffat, Wilson Creek, and Rangely . . . are broad, asymmetrical domes with large amounts of structural closure. The remainder of the producing traps in the state are on rather long, sharp, symmetrical anticlines. More than half the state's relatively important oil and gas fields are on unfaulted or slightly faulted anticlines and domes.

Almost half the producing traps in Northern New Mexico are on unfaulted or slightly faulted anticlines and domes in the San Juan Basin. Hospah, Table Mesa and Rattlesnake fields are on low domes with respective structural closures of about 100, 150 and 200 feet; the Stony Butte field is on a long, narrow, anticline with about 150 feet of structural closure; and the Hogback field is an asymmetrical dome with about 300

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ACID As a Reconditioning Agent

By F. R. COZZENS

ALL patients do not respond to the same remedy; neither can all aged and ailing wells be benefited by one specific process of reconditioning. The sand face of the average stripper well tends to become more or less crystallized over a period of continuous pumping and is often coated with a waxy residue, a condition which generally can be relieved with cleanout tools in connection with explosives or paraffin solvents.

In other cases the sand face takes on a coating of a conglomerate nature which fails to yield to the action of explosives or solvents and, no matter how thoroughly the well is cleaned, still offers stubborn resistance to incoming oil. Sand face analyses of these conglomerate coatings invariably show, among the other constituents such as gypsum, salt, sulphur, etc., a very high content of calcium carbonate, leading to a long-established belief that the condition was confined solely to limestone formations.

As the reconditioning of wells became more general, numerous cases were encountred also in oil-bearing sandstones, and clearly defined examples are now being found in formations with a lime content as low as 10 percent. As to cause, opinions differ. Many operators believe that lime is brought into the shot hole and deposited upon the sand face by incoming oil as a result of gradual disintegration of the cement-like structure which binds the sand particles together. Another theory is that lime accumulates through seepage from upper formations which have not been successfully cased off. The lime which predominates in building up the surface coating is its constituent easiest to break down, and for this purpose, a field-proven treatment is "open hole" dosage with hydrochloric (muriatic) acid.

The use of acid as a reconditioning agent, especially in the so-called sandstone formations, is not to be confused with the practice of acidizing newly-drilled wells in limestone strata where the main objective is to create a reservoir and provide a drainage system into the well. On a reconditioning job, the purpose is to break down and destroy the calcified residue which adheres to the sand face, it being unnecessary and often a waste of time and materials to pressure acid into the sand.

Initial Step

The initial step is to make sure that the well will react to an acid treatment. After pumping equipment (tubing and rods) has been removed and cleanout tools put into action, several samples of the shot-hole residue should be taken and analyzed. If the calcium content is 20 percent or higher, it is generally conceded that acid will be beneficial. If testing facilities are meager, a fairly accurate estimate can be made by immersing a pound or two of residue in a vessel partly filled with hydrochloric acid. Soluble material in the residue causes the mixture to "work" and the acid soon becomes spent or weak.

Conditions having been found receptive, the cleanout tools are operated until the shot-hole is free of sand and all deposits which can be removed by bailing. The sand face is then washed down with salt water or artificial brine. The capacity of the shot-hole must be known, and if there is doubt, salt water is measured into the well by bailer provided with a dump-rod until the shot hole is filled. If the well contains a pocket extending below the bottom of the pay sand, as many old wells do, time and acid may be saved by filling such bores with non-soluble material which can be drilled out later if desired. In most cases, it is advisable also to ascertain the casing point at or near the top of the sand so that acid may not reach and damage the shoulder upon which the casing is seated.

These, and minor local points having been checked and the area of sand face made as dry as possible, a solution of hydrochloric acid (inhibited) is poured into the well until the shot hole is about two-thirds full, care being taken that the top of the acid column is several inches below the casing base.

The well remains open six to eight hours. Acid is then bailed out, and one-half to two-thirds of it (depending upon strength) is caught and saved, the remainder being dumped. Enough fresh acid is added to the quantity saved to equal the amount dumped.

After the shot hole has been washed down thoroughly with salt water or brine and neutralized residue bailed out, the acid is again poured into the well for another six to eight hour standing period, followed by a similar wash down with brine. This process is repeated until the lime content of residue bailed from the shot hole is brought down as nearly as possible to zero. Two or three such applications are usually sufficient to destroy the coating in the average well, and while acid is not a paraffin solvent, most waxy deposits are loosened with the residue and bailed out with it.

Acid when returned each time to the well must be kept or built up very closely to its original strength. It is usually not difficult to maintain the proper strength, as most old wells were shot originally with nitroglycerin and have fairly large shot holes. On straight bore wells, or where more modern selective shooting methods have been practiced, it is sometimes necessary to use new acid for each application. Purpose of intermittent application is to keep the sand face washed free of neutralized residue, and to expose a continuous fresh surface upon which acid action is more uniform. There is less risk also of residue being forced back into sand channels and fractures—a condition which often retards the return of oil is a pressure-depleted well. Since "sloughing off" of the sand face continues for some time after the acid is withdrawn, the well is usually allowed to stand open ten to 12 hours, and the final wash-down with brine is made just prior to returning the pumping equipment.

"Floating Sand"

On various occasions, in oil-bearing sandstone formations, acid supplemented with salt brine has proven beneficial in stubborn cleanout jobs. Results are especially favorable in air-pressured wells which are burdened with so-called "floating sand." The cleanout procedure (after pumping equipment has been removed) is to pour anywhere from 20 to 100 gallons of inhibited acid into the shot hole where it is stirred into the residue by the drill. Stirring is continuous for two or three hours before any bailing is done. Each bailing thereafter is followed by a wash-down with brine. As a result of the practice, residue suspension in the fluid is more complete and less of it adheres to the walls. Fewer runs with the bailer are necessary, and there is a speedier return of oil to the well after the job is completed.

Closely akin to reconditioning, and a stubborn problem on many leases are wells which, through casing leaks, etc., are partially "killed" by fresh water. As is generally known, fresh water hardens the sand face by causing its clay content to swell or expand, thus clogging the drainage system and holding back the oil. Because of its ability to lessen tension in the clay content and reduce it to a more flocculated condition, acid often breaks down the barrier to incoming oil and so proves of value in the revival of such wells. Acid or any other remedy is, of course, of no value in wells completely drowned out, or where avenues of water seepage into the sand cannot be repaired.

Treatment for a damaged well (after water has been shut off) is to fill the shot hole with inhibited hydrochloric acid to within a few inches of the casing point. The well is allowed to stand three to five days. If the shot hole contains considerable soluble deposits, it is necessary from time to time to withdraw part of the fluid and replace it with an equal quantity of new acid. Strength is ascertained by frequent testing.

Before termination of the standing period (if revival prospects are favorable), the fluid upon testing will show some oil. The fluid is then bailed out along with residue held in the shot hole,

and wash-downs with brine are repeated until the quantity of incoming oil justifies pumping. Treatment of water-damaged wells may be classed on the mechanical side of reconditioning and included in the same category is the use of hydrochloric acid in its raw state for the dissolving of pipe and broken metal equipment which obstruct a well, especially in the shot hole, and for the removal of alloy pipe fronting an area of pay sand which has been previously cased off. Properly inhibited acid proves useful in loosening stubborn strings of casing which are bedded in lime deposits. It is a necessity in certain types of selective plugging, and in oil-bearing sandstones where tight or restricted zones contain a lime content of 40 percent or higher, acid is sometimes used as a followup supplement to shooting with nitroglycerin.

Acid treating practices are generally less expensive than other cleaning processes; and although acid action is slow in comparison with explosives or solvents, there are certain phases of well-reconditioning where delayed action is preferable. Detrimental after-effects upon a well, or on an oil-bearing formation, are rare and if simple precautions are taken, damage to operating equipment is reduced to practically zero. Acid is not a panacea for all reconditioning ailments. Neither is it of value in wells non-receptive to its use. Acid justifies, however, a prominent place in the oil operator's remedy kit, and under average field conditions where the need is justified by analysis, it is practically the only medium capable of doing a satisfactory job.

California Standard Grants "Living Allowance" Pay Hike

A "living allowance" wage increase, to be in effect for the next six months, was announced by Standard Oil Company of California for its employes and those of certain wholly-owned domestic subsidiaries.

The increase amounts to $35 a month, for employes now receiving up to $345 a month, and those now receiving between $345 and $380 will be paid the latter figure.

The allowance, retroactive to January 1, exempts only certain seagoing and harbor craft personnel, who recently have received increases, and employes of Standard Stations, Inc., who received an increase in June, 1946. Wage negotiations are currently in progress with representatives of employes of Standard Stations.

Magnolia Reaches Pay Increase Agreement with 5100 Employes

The Associated Petroleum Employes representing approximately 5100 employes of the Magnolia Petroleum Company in producing, drilling, shop, natural gasoline, geophysical, and field research operations have accepted the company's proposal of a 12½ percent increase in pay retroactive to October 1, 1946, and lasting until September 30, 1947.

The first payment was to be made about January 25 to cover October, November and December, less the one week's cost of living allowance paid by the Company in December. This increase will apply to all earnings including pay for vacations, sick benefits, shift differentials and overtime.

Rocky Mountain Oil Region

■ CONTINUED FROM PAGE 30

feet of structural closure. Half the relatively important oil and gas fields in the northern part of the state are on unfaulted or slightly faulted domes.

Slightly more than half the fields in Utah . . . most of them being gas fields . . . are on unfaulted anticlines and domes. Clay Basin and Cisco are on rather symmetrical domes; Last Chance is on a broad, asymmetrical dome; Woodside is on a sharp, asymmetrical dome with 800 feet of structural closure; and Harley is on a low dome with 90 feet of structural closure.

Faulted anticlines and domes: Practically all faulting in known oil and gas fields in the region is normal, occurring in parallel or radial systems on the flanks and crests of anticlines, and as fault closures. Probable exceptions, however, are the faulted gas-bearing anticlines in the Bearpaw Mountains shallow thrust fault zone, North Central Montana.

The fact that the steeply-dipping normal faults occur largely in thick Upper Cretaceous shale enclosing relatively thin sandstones suggests that they resulted from relaxational movements in the highly compressible shale subsequent to folding, and especially so as they die out with depth as lower competent beds are reached. However, even in closely drilled fields the data essential to delimit detailed fault patterns are ordinarily unobtainable, particularly the relationships between surface and subsurface faults.

Among the many fields in the region that well display normal faulting are Cat Creek and Dry Creek, Montana, and Elk Basin, Garland, Hamilton, Salt Creek, and Lost Soldier, Wyoming.

About one third of the oil and gas fields in Montana are faulted anticlines and domes and fault blocks, about one half of these being on small, faulted anticlines and fault blocks in the Bearpaw Mountains shallow thrust-fault zone. The only relatively important faulted fields in the state are Bowes, Cat Creek and Dry Creek, the first-named having a structural closure of about 200 feet the second being, two faulted domes on an elongated anticline, and the third an extremely faulted dome with about 1500 feet of structural closure.

About one-fourth of the oil and gas fields in Wyoming are on faulted anticlines and domes, ranging from lightly faulted fields, such as Greybull and Big Muddy, to fairly symmetrical, rather oval, and severely faulted domes with a large amount of structural closure, such as Elk Basin, Garland, and Salt Creek, to rather elongated, narrow, and unsymmetrical anticlines, such as Pitchfork and Alkali Butte, and finally to La Barge, which may be a complexly faulted structure resembling an anticline.

About half the relatively important fields in Wyoming are faulted anticlines and domes, including Lost Soldier, Baxter Basin, Frannie, Byron, Oregon Basin, Hamilton, and Muskrat.

In Colorado, only three fields are on severely faulted anticlines and domes, and only one, Iles, is of relative economic importance at present.

In Northern New Mexico, about one third of the fields are on faulted anticlines and domes, all but one, Red Mountain, being gas fields, namely Ute dome, Barker Creek, and the Bueyeros area, the last-named containing rich carbon dioxide natural gas.

In Utah, Farnham dome and Ashley Valley are the only fields that are rather severely faulted, the former yielding gas containing 98 percent carbon dioxide.

Monoclines and structural terraces: In Montana, relatively important amounts of oil and gas are produced on the Cut Bank monocline and on the Pondera structural terrace. At Pondera, accumulation has resulted largely from a combination of terrace structure and variations in porosity. Gas is produced on the Hardin structural terrace.

Wyoming has almost half the producing monoclines and structural terraces in the region, all but one, Spring Valley, being on the rim of the Powder River Basin. Some of the monoclines are gentle and unfaulted and others are slightly faulted, The Osage field is the only relatively important producing monocline in the state.

Only four of the oil and gas fields in Colorado are on monoclines and structural terraces, the only relatively important one being Florence.

The four producing monoclines in Northwestern New Mexico dip very gently northeastward, the only important one being the Kutz Canyon gas field.

The old San Juan field and the very small Virgin field in Southeastern and Southwestern Utah, respectively, are on gentle monoclines.

Structural Noses: Although a few producing traps herein classified as low domes may be structural noses, there are apparently only a few authentic producing noses. The largest of these is the Border field, Montana and Alberta. Other productive noses are the Bears Den and Twin Rivers (Reagan) fields, Montana, the G. P. field, Wyoming, the Canon City field, Colorado, and perhaps several small, isolated occurrences of oil and gas on or near the Sweetgrass arch, Montana.

Barren traps: The region has many promising traps that contain non-commercial amounts of oil and gas—or none at all; in fact, the majority of the traps are barren of oil and gas, and those that produce are rarely filled to the limit of structural closure.

As most of the porous sheet sandstones . . . many of which are of marine origin . . . that yield most of the oil and gas in the region contain relatively dilute to fresh water under hydrostatic head, it is the consensus that oil and gas accumulation in them is a fortuitous phenomenon, occurring principally in domes with a large amount of structural closure that are favorably situated with respect to the movement of circulating ground water. Where these relationships are adverse, the domes have been either partly or completely flushed of oil and gas; in fact, relatively rapid water circulation may flush any dome, regardless of the amount of structural closure. Apropos of this conclusion, it is important to consider that the hydrostatic head in sandstones in the present structural basins probably was once greater than now because of the former extensions of these sandstones farther up the flanks of adjacent mountain ranges.

The present state of knowledge does not explain satisfactorily the conditions under which oil and gas have accumulated deep within thick, non-cavernous limestones in some traps and not at the same stratigraphic zone in similar traps elsewhere . . . even near-by.

DRILLING RIGS ARE GOING TO Sea

By J. E. KASTROP
Staff Writer

DRILLING on the Gulf Coast Continental Shelf offers no backlog of previous experience upon which the operator may draw for each new location. The driller of any well outside the land borders is a pioneer, and as such must develop procedure for the unknown from a basis of known data. To arrive at a practical method of operation it is necessary to consider every method thus far advanced for open water drilling, and to attempt to glean from such information factors which, when combined, will present an effective attack on the overall problem.

The engineering department of a company contemplating Continental Shelf development is engaged with a problem having more than the usual percentage of unknowns, and theories must be accepted as potentially workable in order that their practical aspects may be adopted and a working substitute for accumulated experience thus achieved so as to reduce the period of expensive trial and error.

THIS is the second in a series to give a comprehensive picture of technical as well as academic interest in the current operations of offshore drilling along the Louisiana and Texas Gulf Coast. Without attempting to solve the endless problems particular to this area, or to predict the location of future oil reserves, this broad picture of the situation is presented to point out the tremendous obstacles in the path of successful exploitation of a great potential source of petroleum reserves. Geological and geophysical aspects of the Continental Shelf have been presented. This article will dwell on some of the engineering aspects.

Some Interesting Methods Proposed

More than half a dozen theories and their attendant devices have been publicized, and it is probable that in addition a like number of ideas and methods has been offered organizations with sufficient capital to undertake such an operation. The U. S. Patent Office at Washington holds within its files a number of patented methods concerning ways and means of drilling for oil in deep, unprotected waters. Since V-E Day, the number of proponents attempting to supply the solution to offshore drilling problems has increased. However, it is not surprising that in each solution carrying a patent or published in the literature there is revealed new ideas which warrant the close consideration of engineers, and which open up new avenues of approach to the problem.

Among methods of providing a suitable and practical structure on which to locate drilling equipment in water of varying depths are those proposed by Henry E. Gross,[1] who has designed structures for several conditions encountered in open water drilling. One plan calls for a derrick-like structure having legs of the same slope as those of a 122-foot API drilling derrick. It is designed for use in open water up to a maximum of 600 feet, at which depth the base of the derrick forms a square measuring 110 feet on a side. Dual skids formed of heavy piping are secured across the two pairs of legs to provide a means for skidding the foundation into the water and along the ocean bottom, and at the same time offering footing at the well site for the supported loads. It is cross-braced and offers little resistance to wave action near the surface. Provision is made to stack railroad car wheels at the four corners of the bottom section to lend stability to the derrick. It is proposed to drill or jet a hole into the sea floor through each leg and thereby cement a column of pipe into the mud and silt to prevent the structure from overturning (see Figure 1).

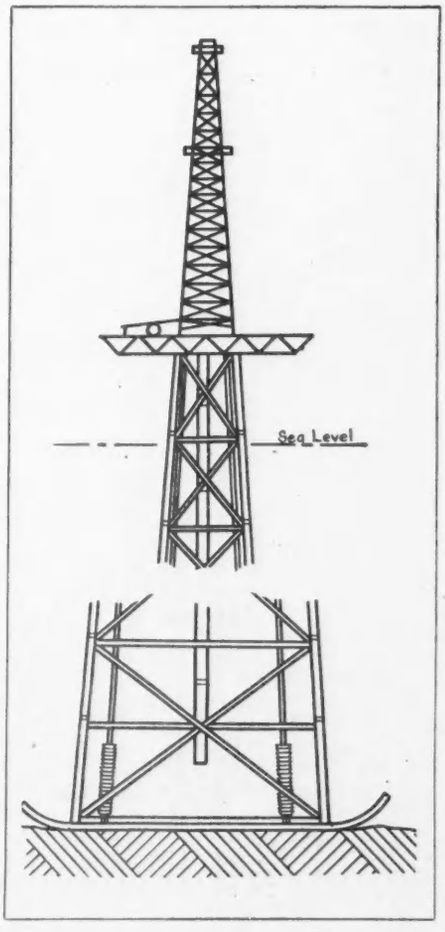

Figure 1. Generalized section of Gross' deep water drilling platform.

For locations in offshore waters up to 100 feet deep, Gross plans a perpendicular tower having legs of heavy angle iron. Horizontal members attached to the base of the legs lie flat on the ocean floor to give footing to the foundation. A pontoon rides on tracks inside the rectangular framework and may be raised or lowered through its own buoyancy, depending on whether or not the tower is to be moved or anchored. The corners of the structure may be spiked into the bottom. It is constructed in a manner similar to that by which the deep water derrick is erected—that is, built in sections, skidded out to deeper water where the upper part of the unfinished derrick is barely exposed, and another section erected thereon. This procedure continues until the desired tower is completed.

Another of Gross' patented methods[2] deals with floating vessels which support the drilling platform well above wave action level through the use of cross bracing and substructures. This method is designed specifically for exploration in offshore waters over 600 feet deep. Two large floating chambers having an appearance similar to that of a submarine are submerged to a point below any effective wave action, and carry the entire load imposed on the drilling platform situated some 40 or 50 feet above the water's surface. These vessels are connected to prevent any relative movement, and may be controlled by automatically-operated propellers so placed as to overcome any lateral displacement due to ocean tides or torsion due to drilling. It is held in position by heavy anchors to which are attached steel cables that are automatically held in some predetermined tension. Modern drilling equipment is used on the platform, with surface pipe cemented and placed in tension in an effort to give additional holding power and stability to the floating structure (see Figure 2).

Kirby Marine Tower

A working model of a structure designed by Kirby Marine Tower Company[3] has been demonstrated to major oil companies. It utilizes eight vertical legs which form an octagonal foundation. The parallel legs are sealed off and adequately cross-braced to withstand severe

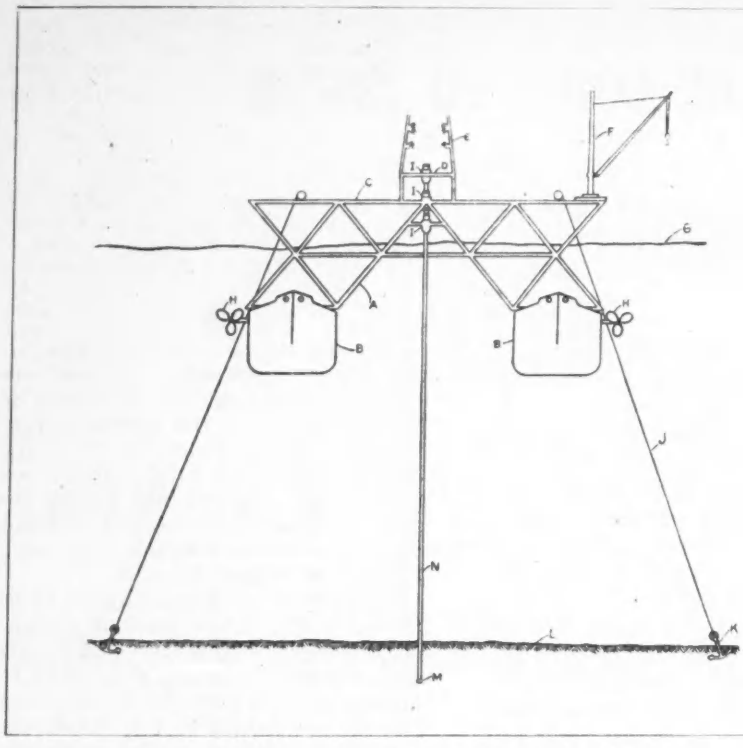

Figure 2. Schematic cross-section of Gross' Floating Platform.

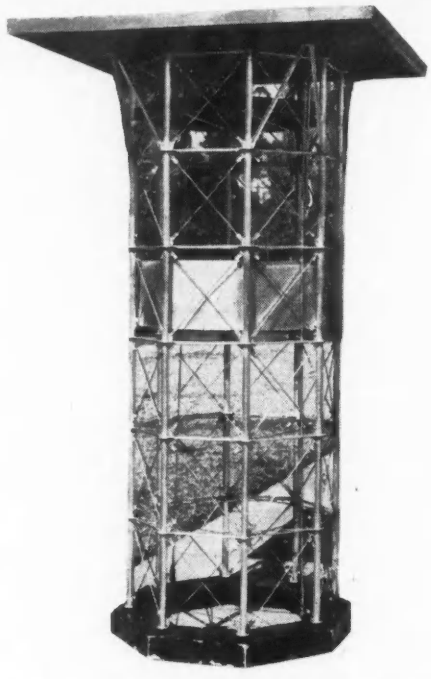

Figure 3. Scale model of the Kirby Marine Drilling Tower.

wave action. It is constructed in sections, the number of sections required depending upon the depth of water in which the tower is to be used. The bottom footing of this tower is an octagonal "doughnut" with a circular center, and forms a chamber which aids in floating the tower to location. This compartment also provides a means of righting the structure when lowering it to the ocean bottom. If more than three sections are required to accommodate the drilling equipment above water, a second flotation compartment is provided. Supported by these two compartments, (including the foundation footing) the entire tower may be floated and towed to the location. Hydraulic pumps and control valves facilitate setting the tower vertically. Once the tower is set on bottom, hydraulic jets level out uneven bottom surfaces. In case three sections or less are required (depending on water depth) the footing compartment has sufficient buoyancy to float the tower in an upright position. Little more than three feet of water are required for this flotation. After the tower has settled on bottom and is securely anchored, a 100-foot square drilling platform is erected on top of the tower to allow ample space for placing the necessary drilling equipment and housing facilities. It is so constructed that the tower may be salvaged in case a dry hole results, and it is desired to move the equipment to another location (see Figure 3).

Robert's Method

In waters where piling can be used, but where conditions make it hazardous to drive piling from a barge, another method has been patented by C. L. Roberts.[4] In this method, it is proposed that four prefabricated towers, 20 feet square and 60 feet in height, be loaded on barges from a pier near the well location. They are constructed of heavy H-beams as vertical legs with suitable cross-bracing. The towers are then transported to the location where they are lowered into the water to form a structure 45 feet square, and extending a safe distance above the water. The framework is decked over and a knocked-down pile driver is set on top of the structure. The drilling platform is then completed with pilings which are driven from this arrangement. It is estimated that such a structure would cost approximately $75,000 when complete, depending, of course, on the depth of water.

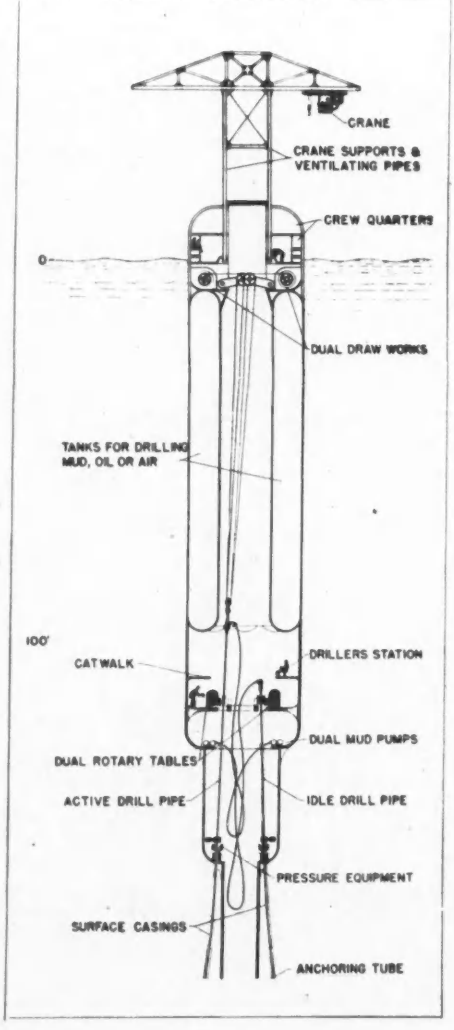

Figure 4. Sectional drawing of Shrewsbury's Drilling Column.

Shrewsbury Drilling Column

Radical designs in modern drilling equipment and methods are indicated in a deep water drilling column designed and patented by R. D. Shrewsbury.[5] His method is developed around a floating column 40 feet in diameter and approximately 200 feet long. During drilling operations, about 160 feet of the column proper is submerged, which limits its application to areas beyond the 200-foot depth zone. As shown in Figure 4, the rotating equipment has been located near the lower end of the column with hosting machinery placed near the surface end. Steel beam structures attached to the column extend above the surface to provide means for loading equipment and supplies. Large buoyancy chambers placed in the middle and concentric with the column support part of the load, while an anchoring tube secured to a reinforced concrete anchoring pile supports the remainder of the load in addition to giving the structure stability. Unusual in the Shrewsbury method are dual rotary tables and well head pressure equipment which make it possible to drill two holes simultaneously. After the surface pipe has been set in two directionally drilled holes, drill pipe pulled from one hole can be run into the second hole. This is claimed to eliminate the need for space in racking pipe

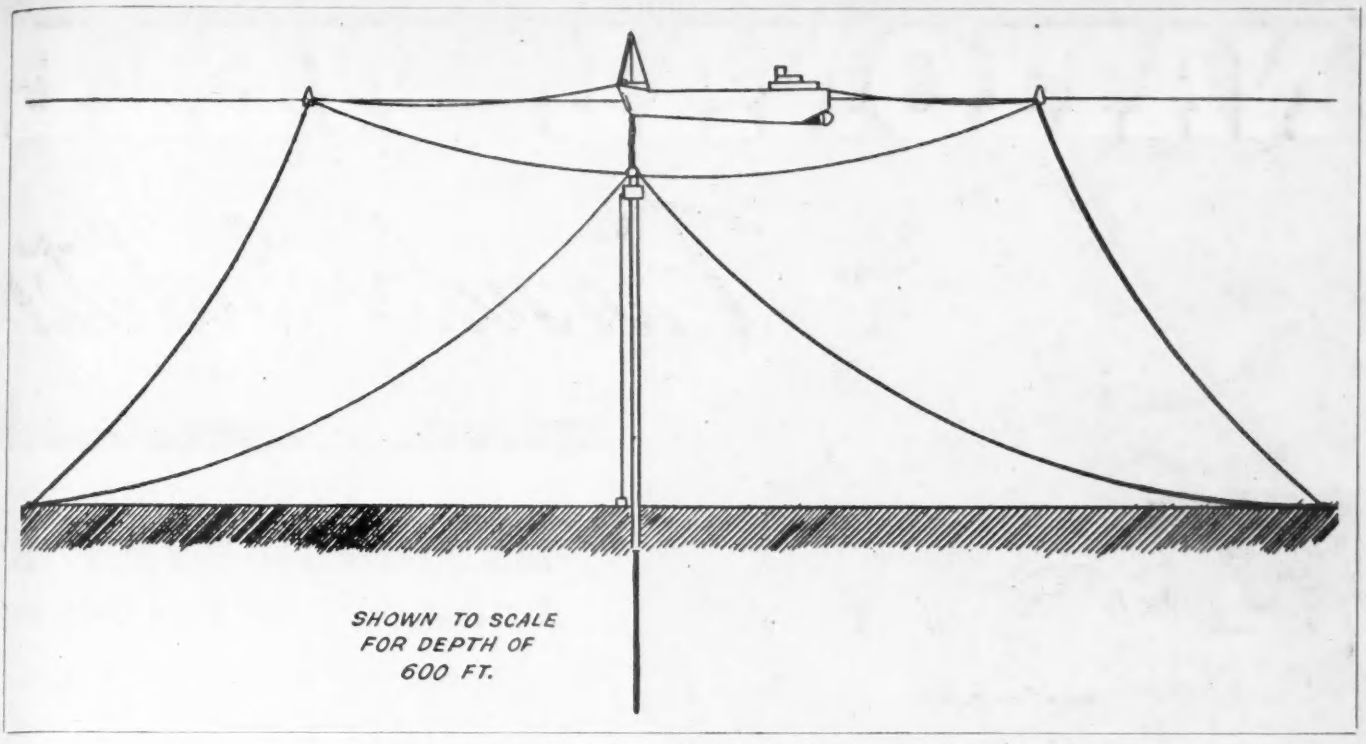

Figure 5. General plant of Tucker's method for deep water drilling.

when making a round trip. It is proposed that this column be constructed on shore and floated out to the well location where it is righted and outfitted with drilling equipment.

Fairlead Method of Underwater Drilling

Another alternate method to rigid platforms is that proposed by A. J. Tucker,[6] marine engineer. Based on the assumption that there can be no permanent piling-type structure supporting drilling equipment that will withstand tropical hurricanes in the Gulf of Mexico, this method utilizes a ship-platform which contains the power units and which is connected to the well head by means of flexible tubing. It features relatively fast abandonment in case of storms and ease of recapture in restoring drilling operations back to normal.

An LST (Landing Ship, Tanks), used successfully by the Navy, is recommended due to its desirable characteristics and ease of adaptation, however, other vessels may be used. The forward part of the LST contains the hoisting machinery, pumps, air compressors, tanks, storage compartments, etc. The living quarters of the ship as well as its propulsion machinery would remain intact. This type vessel will quarter the crew and drilling personnel, and is large enough to withstand heavy seas of hurricane intensity.

How Fairlead Works

The fairlead is a guiding device or funnel located at some predetermined depth between 60 to 100 feet below the water's surface, and held in place by six stays fastened to anchors spaced radially about the well. The ship is held in position by six anchoring buoys chained to the six anchors. Depth of the fairlead is pneumatically and automatically controlled. The unit rests on top of a large-diameter pilot casing, the function of which is to direct the drilling engine and subsequent casing into the hole.

Flexible tubing, such as that used in petroleum lines crossing the English Channel during the war, follows the drilling engine as it progresses downward. This engine is hydraulically powered by the mud, which when exhausted from the engine carries the cuttings to the surface through a low-pressure flexible tubing attached to the surface casing. Should it be necessary to abandon the location, the tubing is purged of the drilling mud by air and withdrawn into the ship's hold.

The method as proposed makes it necessary that the surface casing be joined and screwed up by divers working from a platform on the fair lead. Slips are used to support the pipe string in the hole, while each successive joint is also operated by divers. Blowout preventers hydraulically controlled from the drilling buoy secure the well in case of abandonment (see Figure 5).

Seadrome-Type Platform

Utilizing standard drilling equipment and methods for drilling in offshore waters varying in depth from 20 feet up to 200 feet is the seadrome platform designed by Edward R. Armstrong.[7] The platform is a double-decked structure, rectangular in shape, 70 feet wide and 198 feet long.

Eight cylindrical buoyancy units arranged in a space pattern placing them 66 feet apart along the sides provide flotation during rig moves. Placed longitudinally through the center of each buoyancy unit is a telescoping column on which the buoyancy unit may be raised or lowered. The base of the column is attached to a universal joint mounted on a cone-shaped ballast footing. The upper ends of the telescoping columns are cross-braced and secured to the structural bridgework which forms the platform. The center section of this bridgework is on a higher level than the end sections, providing two decks on which to place drilling equipment.

Flotation of the buoyancy units is controlled by means of compressed air. Depending on the depth of water, the total load imposed on the platform may be supported 100 percent by the columns, partially by the columns and partially by the buoyancy units or 100 percent by the buoyancy units. The ballast footing and telescoping columns make it possible to locate the platform in water overlying irregular ocean bottoms. In case of depths near 200 feet, eight mooring cables are used to add stability in preventing lateral movement of the structure.

The seadrome-type platform is designed to meet the requirements of platform rigidity under ocean weather conditions, to support the required loads, and at the same time to possess a high degree of portability.

Conclusion

These methods briefly described give a glimpse into the vast amount of work and study being done by engineers, designers and inventors outside the oil companies. There are undoubtedly many more ideas and methods already prepared or being formulated by others. The ideas of all these men, some of which are hotly contested by their colleagues, provide a road to the ultimate solution, and give food for thought to those now in the process of juggling the problems of offshore drilling.

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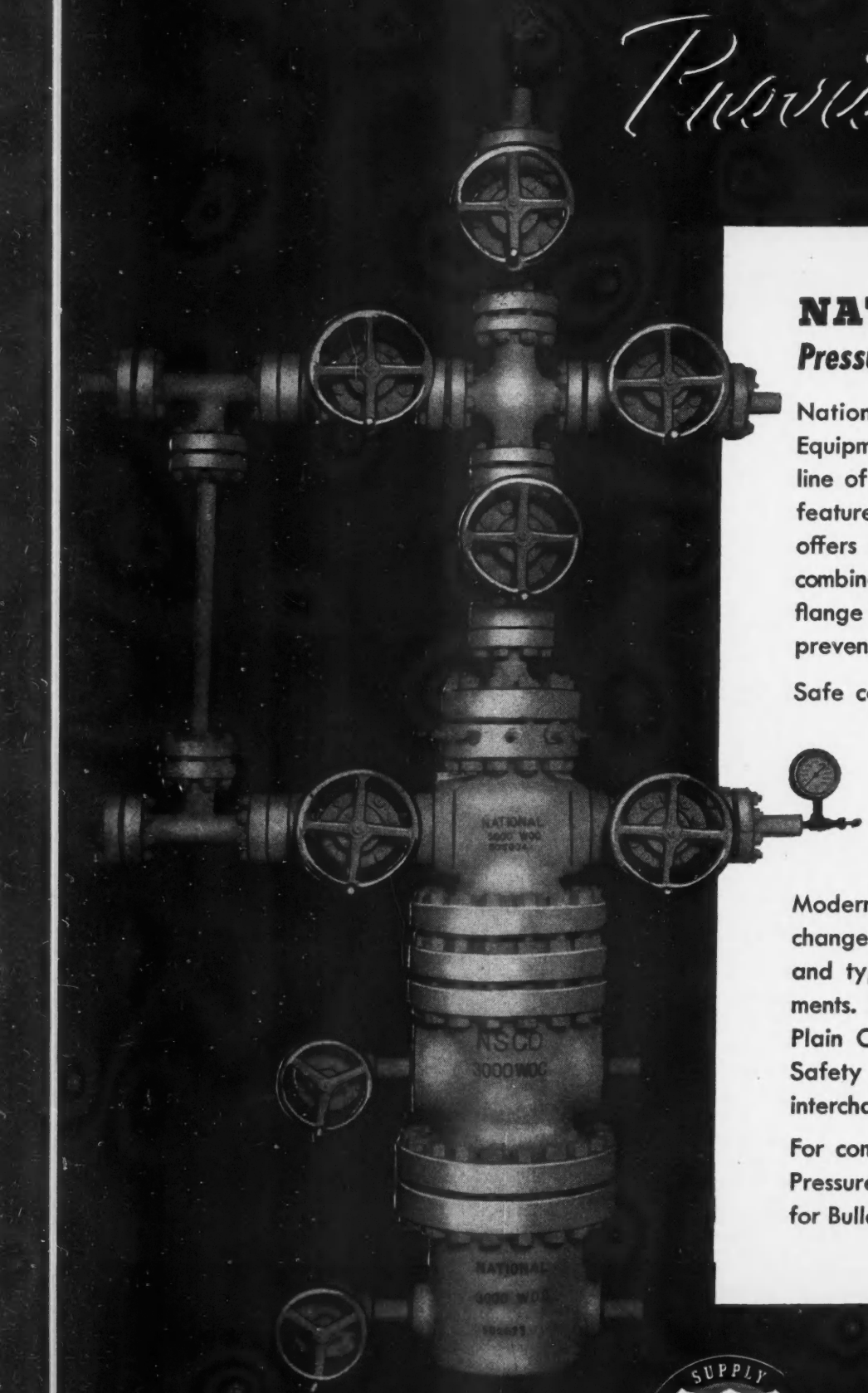

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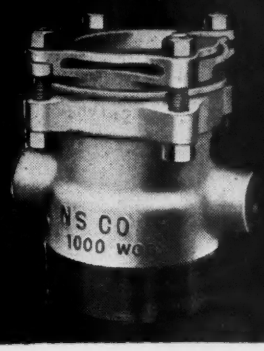
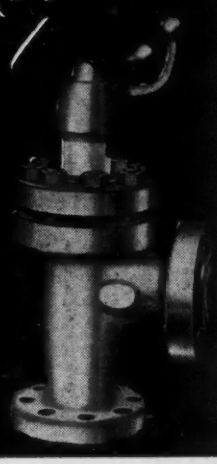
and Dependability





NATIONAL CASING HEAD TYPE KHL-1

The National KHL-1 Casing Head is a simple unit designed to seal off a single string of casing in wells of medium depths and pressures where an independent tubing head is used to support the tubing.

Slip construction permits setting casing with proper tension without using a spacer nipple. The independent packing assembly can be changed or compressed without disturbing the casing setting.

NATIONAL (Adjustable) MICRO CHOKES

The National Type "D" Micro-Choke, which has its principal field of application on high pressure wells, is a thoroughly modern design embodying many new features which obviate the undesirable characteristics commonly associated with chokes of the adjustable type.

TYPE "A" CASING SUPPORT

The National Type "A" Casing Support provides economical means for supporting medium length casing strings where no pressures are to be packed off outside the casing suspended. A spider, supported on the coupling of the outer casing, holds the slips supporting the inner casing. Three-piece slips are assembled with a snap spring around the casing and lowered into the spider by means of wire rope handles. Hard slip wickers grip hardest grades of alloy pipe.

NATIONAL TYPE "W" TUBING HEAD

The National Type "W" tubing head is an extremely flexible unit designed to support a string of tubing and to seal that string from the casing.

This equipment is for applications where an independent tubing head is desired for working pressures from 1,000 through 3,000 pounds per square inch.

THE NATIONAL SUPPLY COMPANY

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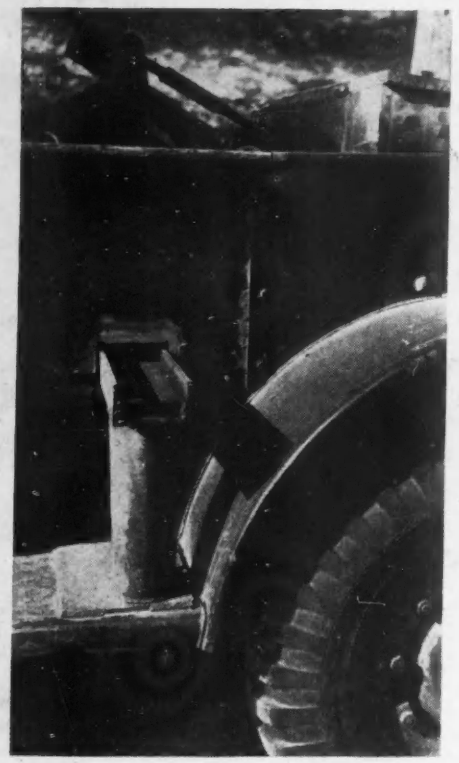
Measuring Reel Bracket Makes Unit Convenient, Efficient



SERVICING EQUIPMENT

Mounting the measuring reel in a pickup truck enables one unit to be used at many locations, and provision of a standard method of mounting eliminates the damage occasionally sustained when a mount must be improvised at the rig or well. One company provides a substantial bracket inside the pick-up truck body for transportation of the reel. This particular mount provides convenience for the operator on the job, thus assuring accurate control at all times, and makes possible the use of the engine power available through the rear wheels in recovering the measuring line from well.

A special slotted beam is built up from channel and angle sections, and mounted inside the truck bed with one end projecting out across the running board. A pipe pedestal welded to the running board and the bracket adds rigidity and support.

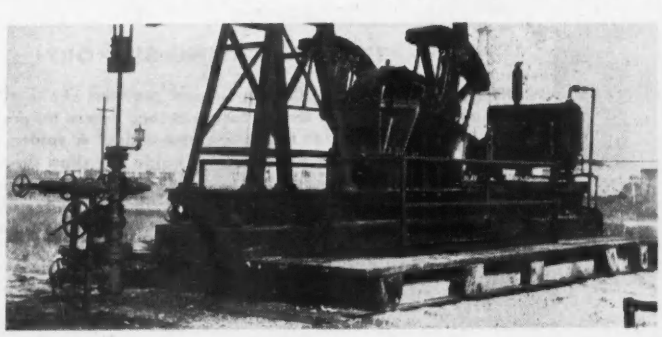
The unit is carried on the inner portion of the support, being clamped to the slotted portion by a heavy screw. When a run is desired, the unit is slipped out of the end of the inside slot, then spotted on the projecting bracket and there clamped while a run is made. By bolting a V-sheave over the hub bolts on the rear wheel which is jacked up off the ground, a power drive is provided for running the measuring line.

Anvil Mounted on Fender

TOOLS

One of the handiest pieces of equipment on the field welding truck belonging to one production company is a small anvil which was made up in the shop and mounted atop the reinforced fender at the rear of the unit. Cut from a piece of three-inch plate, the small steel anvil provides a much-needed base upon which welding work may be hammered or shaped while the material still is hot and easily malleable. The anvil, welded in the position shown, was cut out so its base would match the curvature of the fender, and has one of its upper ends cut away to a point usable on small jobs or in handling circular and ring-shaped materials. Cost and installation of the unit are negligible compared with the saving in man-hours.

Pumping Unit Foundation Made of Heavy Timbers

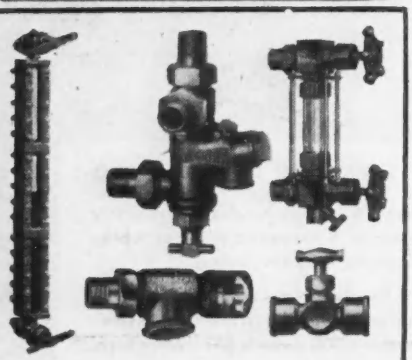


PUMP FOUNDATIONS

Instead of bolting the heavy timbers used as pads under the pumping unit directly to the concrete base, one company uses six 12x12-inch timbers as cross members, extending them on either side of the foundation for about four feet. The unit is then placed atop the base thus formed, and bolted in place. Two-inch planks are laid on the extended cross members, to form a platform extending along both sides and across the power end of the pumping unit. This paltform is always dry, clean, and affords good surface from which to work when servicing the unit.

The two pipe guards used to enclose the counterweights simply rest on the platform, being made to abutt against the end of the engine support and to fit against the sides of the pump skid. Even if the well site is flooded, the raised working platform remains clear, and may be hosed down when necessary after a servicing job. The edge of the platform also serves as fender to prevent the service truck from being driven too close to the pumping unit, and aids in handling material.

PENBERTHY
QUALITY
PRODUCTS



Penberthy liquid level gages of various types—injectors—ejectors—all so widely used throughout the oil industry because they have always been dependable under the most severe service conditions.

All are of rugged construction and made by an organization with 57 years experience in the manufacture of quality products.

See Pages 3126 to 3131
Composite Catalog

PENBERTHY INJECTOR CO.
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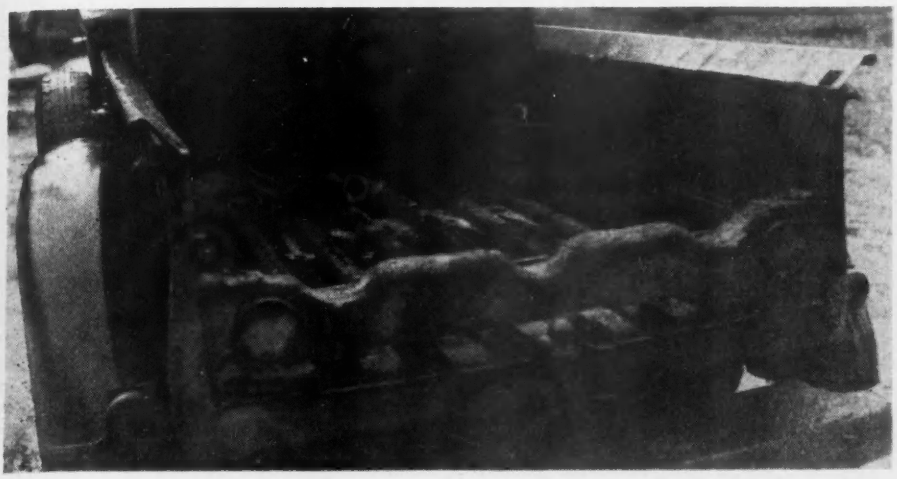
PRODUCTION HINTS

Steel Ribs Prolong Life of Pickup Truck Bed

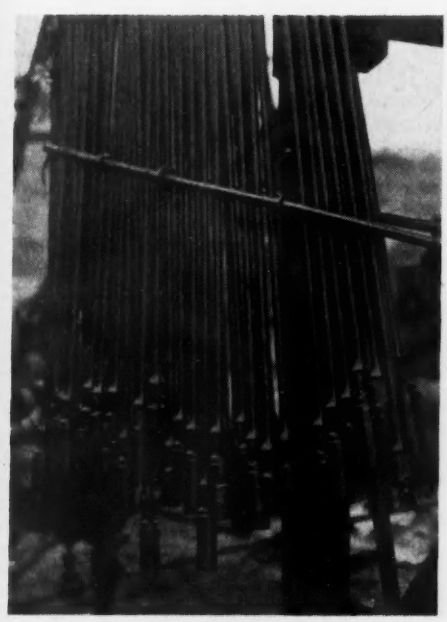


EQUIPMENT CARE

Prolonging the life of the pickup truck bed is accomplished by one company by reinforcing the bed floor with longitudinal ribs or wear-strips of split sections of 2-inch pipe. Welded in place on about five-inch centers, these ribs serve at least two purposes: (1) they take the wear that otherwise would fall on the relatively thin bed, preventing premature wearing out of that material, and (2) they ease the handling of heavy or odd-shaped pieces of equipment, friction being reduced considerably due to limited contact between the object and the truck bed.

Another time saving aid is the modified tail gate employed on the vehicle. Ideal for carrying special tools, pipe subs and odd lengths of pipe, the gate is made of a length of 2x6 into which has been cut several depressions and in which tools may be positioned to prevent rolling from side to side. For shorter tools, the floor ribs serve the same purpose in keeping materials from rolling excessively.

Narrow Hold-Back Device Permits Rod Inspection



$5.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas

WELL SERVICING

A narrow, easily handled sucker rod hold-back device successfully employed by one production company consists of a length of sucker rod bent into the shape of a hairpin. The length of the device is governed by the footage of rods expected to be handled, but the gap or space between the bends is limited to only slightly more than the diameter of the rods themselves. While the racking of rods in a narrow row permits rapid tallying of the stands, another feature added to this particular installation simplifies the process even further. Metal thimbles having two round eyes to permit their being run over the parallel bars, are run up against the already racked rods at desired intervals, at about every 10 or 20 stands. Thus in a matter of seconds, an entire string of rods may be accurately tallied. Inspection also is easier, due to the narrow space in which the rods are confined and in which there is no chance for bunching of rods with consequent entangling and difficulty of counting.

The simple rack is lashed to any convenient portion of the derrick structure. On the truck between jobs, the device takes up a negligible amount of space.

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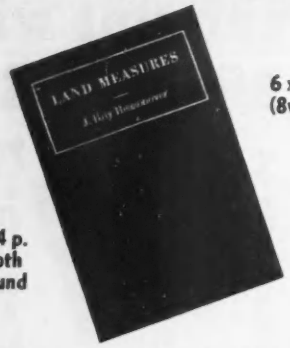

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PAGES 3945 THRU 3964 IN THE COMPOSITE CATALOG

YEARBOOK FORECAST issue

coming February 10

During the coming twelve months you'll frequently want to refer to its quick-as-a-glance information about exploration, drilling, reserves, production, stocks, consumption, pipe line construction, and refined product output. These highlights of the past provide a sound background on which to base present plans and decisions.

Renew now — Don't miss it!

THE OIL WEEKLY

Patent Roundup

A Regular Feature of THE OIL WEEKLY

In this column are reviewed patents dealing with drilling, producing and pipe line branches of the oil industry that are issued by the United States Patent Office.

Patents issued by the United States Patent Office, Washington, D. C., include those listed below.

Printed copies of the patents listed are furnished by the Patent Office for 25 cents per copy and can be had by addressing the Commissioner of Patents, Washington, D. C.

Pipe Holder

This patent (No. 2,413,297) was issued to Harold B. Deckert, Inez, Texas, and is unassigned.

The holder is adapted to be mounted in a derrick and comprises a plate-like support with a lever pivotally mounted between its ends. One end of the support is formed into a pipe engaging hook, the lever being movable to an active position to carry the hook out beyond a margin of the support into position to receive a pipe section to be held. A yieldable member is connected to the lever and arranged to be placed under tension when the lever is moved to active position. A latch on the support can engage the other end of the lever to hold the hook extended out beyond the margin of the support, the yieldable member operating automatically to withdraw the hook behind the margin and into inactive position upon release of the latch.

Measuring Line Stripping Block

William P. Morris, Lovington, New Mex., has patented this device (No. 2,413,367). It is unassigned.

This device for cleaning and oiling a measuring line consists of a housing with a threading member slotted on its lower side, a pair of gaskets in the housing, surrounding the threading member and having cleaning surfaces extending in the path of the line that emerges from the member through the slot. An oiling sheave rotatably mounted in the housing and receiving the line after passage between the cleaning surfaces is immersible in an oil bath.

Formation Permeability

This method of determining fluid permeability and elevation of earth formations (No. 2,413,435) was patented by Leo A. Courter of Seminole, Okla., and assigned to The Dow Chemical Company, Midland, Mich.

A liquid is introduced into a well to fill it to a point above the formations to be measured, followed by a second liquid of lower density than the first with which it does not mix, thereby forming two liquid columns meeting at an interface in the well above the formations to be measured. The continued injection of the second liquid into the well at a known rate forces the first liquid into the adjacent formations and ascertains the rate of descent of the interface, the rate changing on traversing a fluid-permeable part of the well. By ascertaining the elevation of the interface as its rate of descent changes, the change in the rate of descent measures the permeability of the formation at the elevation at which the rate of descent changes.

Pipe Coupling

A patent for this device (No. 2,413,840) has been issued to Jean Mercier, New York City, and is unassigned.

The coupling comprises a pipe assembled with a pipe member, a rigid outer collar which moves longitudinally in relation to the pipe and member, with a means to fix it to the pipe member, a rigid inner collar between outer collar and outer wall of pipe. Only a single edge of the inner collar joins the outer wall of pipe, the pipe having an enlargement at that point, a location that also opposes the longitudinal movement of the pipe from the pipe member. The arrangement further includes a gasket partly located between and against the inner collar and the outer wall of pipe, another part of the gasket, more easily compressible than the first part, being spaced lengthwise from the inner collar away from the pipe member. The transverse wall of the outer collar adjoins a transverse wall of the other part of the gasket, the outer collar forcing the inner collar and gasket longitudinally towards the pipe member in the direction in which the outer collar moves toward the pipe member while holding the adjoining walls of the inner collar and pipe member in close relation.

Well Surveying

George A. Smith, Philadelphia, has patented this instrument (No. 2,413,005) and assigned it to Sperry-Sun Well Surveying Company of Philadelphia.

The instrument is comprised of a casing to be lowered into a well, a means for supporting a sensitized record member in the casing, which also contains a compass having luminescent indicia, and a lens movable in accordance with inclination of the casing for projecting an image of the indicia upon the record member.

Well Sounding Apparatus

Alexander Wolf and Laurence G. Cowles, Houston, have patented this apparatus (No. 2,411,311) and assigned it to The Texas Company, New York.

The means for recording pressure impulses from a well consists of a number of Bourdon tubes mounted on a common support, their open ends communicating with the well, and oppositely disposed on the support to reduce voltages induced by vibration. A pressure-sensitive device is connected with the closed end of each of the tubes, and there is a means for balancing the amplitudes of the voltages emanating from the pickup devices to overcome differences in their sensitivity. A recording device operatively connected to the balancing means records impulses transmitted from the well through the pickup devices.

The Spring is the Secret

It Assures Tight Contact Between Fusible Element and Body of Plug .....

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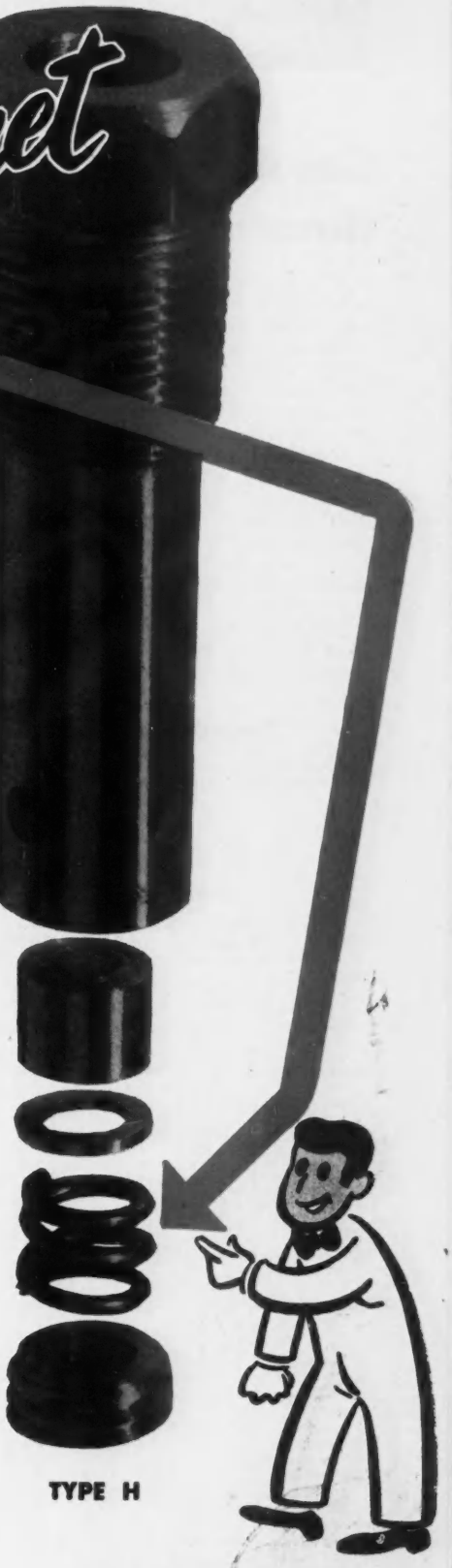
Hunt Fuse Plug Holders are made of stainless steel and bronze. Holders can be furnished with extra long threads for oversize tapping. Please specify pressures when ordering Hunt Fusible Plug inserts. Available from stock in ¾"x 4¼" and 1"x3¾".



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Gasoline Stocks Increase Sharply; Burning Oil Withdrawals Heavy

A sharp increase in gasoline stocks and heavy withdrawals from burning oil inventories were reported in the weekly bulletin of The American Petroleum Institute. Daily average crude production was boosted during the week, with about the same hike applying to crude runs to refinery stills.

Increased output of light and heavy fuel oils failed to hold the line against market needs and as a result stock reductions were increased considerably over the previous week's. The week saw accelerated accumulations of gasoline stocks despite a small cutback in refinery production.

Crude production in U. S. fields averaged 4,672,000 barrels daily during the week of January 25, an increase of 48,000 barrels daily compared to the previous week's average, and 46,000 barrels over the daily rate of last year's week. Crude runs to refinery stills averaged 4,820,000 barrels daily during the week to show an increase of 44,000 barrels over the previous week's runs. Compared to the runs of last year's comparable period, this week's were 313,000 barrels or 6.9 percent higher.

Stocks of refinable crude totaled 221,144,000 barrels on January 18, an increase of 591,000 barrels over the 220,553,000 barrels reported a week earlier, and 1,435,000 barrels more than were on hand a year before, according to The Bureau of Mines.

The week's output of gasoline, which included natural blended at the refineries, totaled 14,624,000 barrels, a drop of 29,000 barrels from the previous week, and 1,613,000 barrels or 12.4 percent greater than that produced in the comparable week of last year. Stocks of finished and unfinished gasoline, continuing their normal seasonal trends, rose 1,788,000 barrels to new level of 99,801,000 barrels. That inventory was 1,982,000 barrels or 1.9 percent lower than that of a year ago.

Distillate fuel oil production increased 135,000 barrels to total 50,357,000 barrels for the week. However, that was 129,000 barrels or 2.2 percent less than was produced in last year's comparable week. Stocks of this light fuel oil totaled 50,357,000 barrels after being reduced 2,369,000 barrels during the seven-day period. That was 20,997,000 barrels or 71.5 percent more than was in storage a year before.

Residual fuel oil output totaled 8,224,000 barrels for the week, an increase of 68,000 barrels over the week before, but 206,000 barrels or 2.4 percent less than was produced a year ago. Stocks of this fuel dropped 1,981,000 barrels and totaled 48,558,000 barrels at the week's end. That was 12,665,000 barrels or 35.3 percent more than was on hand a year ago.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod.		Runs to Stills		Crude Stocks		Gasoline Stocks		Gasoil and Distillate Stocks		Residual Fuel Oil Stocks	
	Barrels Daily	Week Ended	Barrels Daily	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended	Barrels	Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	47,861	11-14	95,857	1- 8
1943	4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	47,187	11-27	72,881	1- 2
1944	4,762	9-30	4,798	12-30	240,992	1- 1	89,162	4- 1	48,162	10-28	64,744	10- 7
1945	4,944	7-21	[5]5,140	8-18	227,554	10-13	99,012	3-24	45,341	11-17	56,074	1- 6
1946	[4]4,961	6-15	4,968	12-28	229,430	3- 2	105,233	2-16	[1]67,286	11- 9	61,636	11- 2
1947	4,672	1-25	4,917	1- 4	223,291	1- 4	99,801	1-25	58,034	1- 4	53,285	1- 4
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 3
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,382	4-12	90,914	7-13
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-18	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	220,258	9- 9	76,302	1- 1	30,232	4-19	49,737	3-18
1945	3,621	10- 6	3,409	10-6	[4]211,813	8-25	70,791	10-13	26,483	3-17	38,548	5-26
1946	4,403	3- 9	4,498	1-12	218,193	1- 5	85,324	9-28	25,131	3- 9	37,289	4- 6
1947	4,531	1-11	4,776	1-18	220,553	1-11	94,882	1- 4	50,357	1-25	48,558	1-25

TRENDS OF 1946 AND 1947

Trends in Week Ended	Crude Oil			Gasoline		Gasoil and Distillate		Residual Fuel	
	Production Daily	Runs to Stills Daily	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End	Production Weekly	Stocks Week End
1946:									
January 5	4,548	4,651	218,193	14,488	98,494	5,293	35,199	8,867	42,371
January 26	4,626	4,553	220,544	13,622	101,737	5,720	29,498	8,411	39,722
February 23	4,714	4,595	226,699	13,175	104,709	5,728	25,398	7,913	39,290
March 30	4,425	4,684	224,994	13,896	104,715	5,337	28,240	8,738	37,746
April 27	4,672	4,685	224,443	14,228	99,631	5,568	30,466	9,204	39,404
May 25	4,759	4,857	222,214	14,312	95,769	5,463	32,973	8,908	43,368
June 29	4,957	4,854	223,883	14,500	92,333	5,325	37,762	8,828	46,447
July 27	4,926	4,896	223,756	14,535	88,626	5,817	44,316	8,217	49,517
August 31	4,833	4,911	227,132	15,014	87,217	5,630	53,134	8,539	53,173
September 28	4,778	4,829	223,043	14,675	85,324	5,632	59,827	8,172	57,657
October 26	4,730	4,758	221,184	14,863	86,423	5,710	65,499	7,728	60,872
November 30	4,795	4,707	227,693	15,145	88,371	5,258	66,062	7,672	58,647
December 28	4,713	4,968	225,995	15,604	93,126	5,931	58,941	8,181	53,427
1947:									
January 4	4,649	4,917	223,291	15,281	94,882	5,857	58,034	8,375	53,285
January 11	4,531	4,778	220,553	14,928	96,547	5,820	54,788	7,801	51,423
January 18	4,624	4,776	221,144	14,653	98,013	5,495	52,726	8,156	50,539
January 25, 1947	4,672	4,820	.....	14,624	99,801	5,630	50,357	8,224	48,558
January 26, 1946	4,626	4,507	[5]219,709	13,011	101,783	5,759	29,360	8,430	35,893
Change:									
In Week	+48	+44	+591	−29	+1,788	+135	−2,369	+68	−1,981
In Year	+46	+313	+1,435	+1,613	−1,982	−129	+20,997	−206	+12,665
In Year	+1.0%	+6.9%	+0.7%	+12.4%	−1.9%	−2.2%	+71.5%	−2.4%	+35.3%

[1] All time peak. [2] Lowest between January, 1922 and July 1, 1944. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent states. [4] Lowest since December, 1921. [5] Stocks, January 26, 1946.

Demand Continues Strong for Most Refined Products

A continued strong demand for most refined petroleum products, especially kerosine, kept prices throughout the nation generally unchanged last week.

A sharp increase in demand for kerosine was reported in the Pennsylvania-Ohio-Michigan region and also across the border in Canada. Some refiners in the Bradford-Warren sector were credited with advancing their prices for 45 water white kerosine .25-cent to 7.25 cents. Gasoline demand in the Western Pennsylvania area was steady with stocks reported as low.

The shortage of kerosine also extended into the Gulf Coast region with suppliers reporting many inquiries for the product. Inquiry for cargoes of 70-72 octane leaded gasoline from foreign sources was cited by Gulf Coast suppliers.

Meantime, consumer tank wagon prices for range oil and No. 1 fuel have been reduced ½ cent per gallon by Chicago distributors on deliveries under 400 gallons. The new prices are 50-99 gallons, 11 cents; 100-149 gallons, 10 cents; 150-399 gallons, 9.5 cents. The price for deliveries of 400 gallons and over remained unchanged at 9.5 cents. The reductions were credited to warmer weather and competition.

Fuel oil was still tight in the Central Michigan region where a shortage of crude exists, reports say. Unsuccessful attempts to buy Mid-Continent and Southwest crude was reported by one refiner.

The price for No. 2 fuel oil on the Atlantic Coast continued to be shaky with the posting at Boston being 6.3 cents and at New York harbor around 6.8 cents.

☆ California

Kettleman Hills Middle Dome Has New Deep Producing Zone

New deep producing zone discovered on Kettleman Hills Middle Dome; well good for 480 barrels is completed in 56-year-old Ventura County field, causing revision of Eocene possibilities in the area; Elwood completion extends Sespe production to the west; westerly extension test of Trico gas field fails to find pay; less than 1300 feet of drill pipe fish remains in world's record well.

Kings County: Discovery of a new deep producing zone on Kettleman Hills Middle Dome in Kings County, Calif., has been announced by Standard Oil Company of California, acting as drilling contractor for the Middle Dome Association.

Standard said Middle Dome Well 73-30V flowed on test at an estimated rate of 500 to 1000 barrels daily of 35-gravity crude.

The well was drilled to 12,389 feet with 6⅝-inch casing cemented at 10,921 feet. Drill pipe is stuck in the hole from 10,971 to 12,369 feet. The test was made with tubing set with packer at the bottom of the casing. The well is now shut in and standing with surface pressure 1900 pounds.

A spokesman for Standard said the successful test indicates a new producing field from sands of Eocene age.

Slightly more than 500,000 barrels of oil have been produced from the Temblor (Miocene) on the Middle Dome, but there has been no commercial production in the past several years.

Lebow and McNee failed to find the pay in their Trico gas field outpost, Hacienda 1 in 11-24s-22e, and quit at 4460 feet. Location is about 1½ miles west of production. Shell completed the third of a series of wells and is drilling on its Alpaugh Community lease in the northwest part of the field. Trico Oil and Gas Company prepared to get under way with the first of a number of development wells it had scheduled in the same general area.

Ventura County: Milner Oil Company's completion of a good well from sands of Eocene age in the old Bardsdale field is a fine example of the effect on production of modern engineering and a reminder to California operators that they may have underestimated the possibilites of the Eocene in this general area. Milner's Dryden 2 in 12-3n-20w was completed flowing 480 barrels of 35-gravity oil, 10 percent cut, from 6600 feet.

Bardsdale is one of the oldest fields in California, having been discovered in 1891 by Union Oil Company in a well drilled to the Sespe formation. Union, which owns most of the acreage in the field, drilled for deeper production about 12 years ago and was successful in establishing production from the Eocene. None of the previous Eocene completions, which were drilled some time ago, had as high an initial as the Milner well and the relatively high production of the latter is attributable to modern completion methods.

Santa Barbara County: Signal Oil and Gas Company has completed State 208-11 on a State tidelands lease in the Elwood field flowing 400 barrels through a 16/64-inch choke with 1180 pounds pressure on the casing and 365 pounds on tubing. The well, which was circulated in with oil, extends Sespe production in the Elwood field to the west. Principal producing sand at Elwood is the Vaqueros. Sespe wells in this field have not been particularly impressive heretofore.

Fresno County: Finley Company has brought in a small southwest outpost well off the Coalinga West Side field. The well was completed in Temblor sands at 1853 feet and will make 10 to 15 barrels a day of low gravity oil. A second well will be drilled 650 feet north of the first. Both locations are in 1-21s-14e.

North of the Northeast Coalinga field Sharples Corporation spudded its first California wildcat, Hyde 1 in 6-19s-16e, and made 4000 feet in the first ten days of drilling.

Kern County: Pacific Oil and Gas Development Corporation has completed Cantleberry 73 in the new field it discovered last July 5 miles east of the town of Jasmine. Well is currently pumping 45 barrels of 12.7-gravity oil, 11 percent cut, from lower Vedder sands. Cantleberry 74 should be completed in a few days.

Richfield Oil Corporation is making a series of formation tests in C.L.A. 21-33, a well it has drilled in the Coles Levee field for new production below the Stevens zone. Test last week of an unknown interval above 12,317 feet produced only a small amount of oil and gas. Richfield has abandoned C.L.A. 16-34, an extension test on the south flank of the field at 9589 feet.

Less than 1300 feet of drill pipe now remains in Pacific Western Oil Corporation's National Royalties 1, world's deepest well. Fishing operations are continuing in the hope of getting all the pipe out of the hole. Bit rests on bottom at 16,668 feet.

☆ Oklahoma

Anadarko Basin Discovery Is Good for 2400 Barrels Daily

Anadarko Basin discovery completed for 2400 barrels daily; Carter seeking to inject gas at old Cromwell pool; Noble County discovery increases activity in northern Oklahoma; new pay found in East Lindsay pool opener; Wayne sector extensioner completed; Key West field of Lincoln County extended ½ mile south.

Garvin County: Most talked-about well in Oklahoma is Sohio Petroleum Company's discovery in the big Anadarko Basin. Howard 1, SE SE NW 17-1n-2w, near the Eola area, southwestern part of the county, has been completed for 100 barrels of oil per hour, with flow

Wells Completed in United States in Week Ended January 25, 1947

Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.

State or District	FIELD COMPLETIONS: New Wells: Oil	Dist.	Gas	*Input	Dry	Total	Old Wells Deepened	EXPLORATORY COMPLETIONS: Oil	Dist.	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	This Week 1946
Arkansas	...	...	...	...	...	...	...	...	...	...	...	...	...	5	3
California	32	...	2	...	...	34	2	...	...	...	5	5	41	34	35
Colorado	4	...	...	...	...	4	...	...	...	...	...	...	4	...	5
Florida	...	...	...	...	...	...	...	...	...	...	1	1	1	...	1
Illinois	20	...	...	...	12	32	...	4	...	...	10	14	46	33	30
Indiana	3	...	...	...	2	5	...	...	...	...	1	1	6	24	3
Kansas	21	...	6	...	3	30	...	2	...	...	6	8	38	34	38
Kentucky	1	...	...	...	1	2	...	...	...	...	2	2	4	13	6
Louisiana	12	1	1	...	3	17	...	3	3	1	3	10	27	19	24
N. Louisiana	8	...	1	...	1	10	...	1	...	1	2	4	14	9	16
S. Louisiana	4	1	...	...	2	7	...	2	3	...	1	6	13	10	8
Michigan	2	...	4	...	...	6	...	...	...	...	6	6	12	13	15
Mississippi	5	...	...	...	...	5	...	...	...	...	...	...	5	5	5
Montana	1	...	...	...	...	1	...	...	...	...	...	...	1	2	2
New Mexico	8	...	2	...	1	11	...	...	...	...	1	1	12	9	6
New York	16	...	1	10	...	27	...	...	...	...	...	...	27	25	25
Ohio	8	...	9	...	6	23	1	...	...	...	2	2	26	31	25
Oklahoma	34	...	3	...	16	53	4	...	...	...	15	15	72	51	47
Pennsylvania	27	...	3	15	5	50	1	...	...	...	...	...	51	45	47
Texas	82	...	7	1	19	109	3	6	...	2	23	31	143	146	117
E. Tex. Bor. Co's	...	...	3	...	...	3	...	...	...	...	...	...	3	...	3
Rest of E. Tex.	2	...	...	...	1	3	...	...	...	...	...	...	3	11	6
North Texas	20	...	...	1	9	30	1	1	...	...	4	5	36	35	34
W. Central Tex.	3	...	...	...	...	3	1	...	...	...	4	4	8	13	12
West Texas	24	...	1	...	3	28	1	2	...	...	4	6	35	29	26
Texas Panhandle	4	...	1	...	1	6	...	...	...	...	...	...	6	9	10
G. Coast, Upper	11	...	...	...	2	13	...	1	...	1	6	8	21	19	11
G. Coast, Lower	11	...	2	...	2	15	...	2	...	...	2	4	19	22	9
Southwest Texas	6	...	...	...	1	7	...	...	...	1	2	3	10	5	5
S. Central Tex.	1	...	...	...	...	1	...	...	...	...	1	1	2	3	1
West Virginia	3	...	6	...	1	10	1	...	...	...	...	...	11	21	15
Wyoming	1	...	...	...	1	2	...	...	...	1	1	2	4	1	5
Total U.S.	280	1	44	26	70	421	12	15	3	4	76	98	531	511	454

* Includes salt water disposal wells.

coming from the McLish sand, 10,064-234 feet. The well started flowing January 23, and it was first reported that the flow was estimated at from 1000 to 2000 barrels per hour. Drilled as a tight hole, no official data was released by Sohio until the well was completed. The company reported that the estimates were exaggerated through erroneous reports circulating among scouts, landmen and royalty buyers. At any rate, field men look on this well as one of the major discoveries of the state. It supports the belief that the huge Anadarko Basin may be a vast storehouse of crude. This area failed to uphold its expectations during 1946, but with the Howard discovery, oil men feel that the turning point for the huge area may have been reached. It is certain that a great amount of deep drilling will be carried on in the area during 1947. A tremendous volume of gas accompanied the oil flow. The wildcat was spudded November 25, 1945.

Seminole County: The Carter Oil Company has applied to the Oklahoma Corporation Commission for a permit to repressure with gas a lease in the old Cromwell pool of Northeastern Seminole County. Hearing has been set for February 11. The company owns the Ruby Hall lease, NE NE 16-10n-8e, with British-American Oil Company holding a quarter interest. Four wells have been drilled and the Cromwell sand, found at 3422-532 feet, is almost depleted. First development of the area was in 1924. Carter plans to inject 50,000 cubic feet of gas a day into the Hall 2, NE NE NE Sect. 16.

Noble County: C. C. Harwell et al's Greer 1, SW SW SW 24-23n-1w, southeast of the Tonkawa field, which opened a new Bartlesville sand pool, is held responsible for an increase in activity in the county. Operators feel that even better production in the area will be found in the deeper Wilcox sand horizon. The Greer 1 flowed 60½ barrels of oil in 1 hour and 25 minutes from Bartlesville at 4374-95 feet. Pipe line outlet is now awaited. Several major companies have been buying up leases in the area, and it is thought that Harwell is planning at least 4 wells in the near future, to be drilled in the immediate vicinity of the discovery.

East Lindsay Area: Max Pray and R. L. Bauman apparently have opened a second producing zone in the new East Lindsay pool by their Martin-Rose 1, CNE NE NE 1-4n-4w. The Rose is now testing oil from the basal Hunton lime. Previously, the well opened the area with production from the Bromide. The well flowed 59 barrels of oil in 1 hour on test of the Hunton from 9060-100 feet.

McClain County: Sinclair Prairie Oil Company has successfully extended production in the Southwest Wayne pool ¾ mile north. The Garrett 1, NW SW SE 13-5n-2w, flowed 15 barrels of oil per hour through ¼-inch choke from the Bois d'Arc section of the Hunton lime, 6730-90 feet.

Lincoln County: Extension of the old Key West field ½ mile south has been successful. Fred C. Summers' Brooks Heirs 1, NW SW SE 14-14n-6e, swabbed 25 barrels of oil per day from the Prue sand, 2882-969 feet. The well is now in process of completion, with total depth 2970 feet in the Prue. Operator holds a small spread of leases, and additional drilling of the area is expected shortly.

☆ Kansas

Cowley County Wildcat Opens Oil Pool from Bartlesville

Cowley County wildcat opens new pool; Mississippi lime pool opened in Butler County; Skelly wildcat completed for 323 barrels.

Cowley County: An oil pool, with production from the Bartlesville sand, has been opened in Cowley County by Kewanee Oil Company. Combs 1, NE NE SE 5-30s-5e, pumped 50 barrels per day from the Bartlesville from 2835-45 and 2851-53 feet. Total depth is 2863 feet, with top of the formation set at 2835 feet. The well, located 2 miles northeast of the Daniels pool, was assigned a physical potential of 50 barrels.

Butler County: Credited with being the first pool opener of the year in Kansas is H. S. Inger et al's Steenberg 1, SW SE SW SW 22-26s-7e. The well, which opens a Mississippi lime pool, pumped 40 barrels per day from that formation at 2742-50 feet. Top of the pay is 2742 feet, with total depth 2750 feet. The well is located two miles north of the Young pool.

Ellis County: Skelly Oil Company has completed its discovery well of the Solomon Northeast pool for 323 barrels of oil per day on pump. Production is from the Arbuckle lime, topped at 3639 feet and drilled to 3641 feet, total depth. The new area opened by this wildcat is 1¾ miles northeast of production in the Solomon pool.

☆ New Mexico

Lea County Wildcat to Make Pumper from San Andres

Northeastern Lea County wildcat to make pumper from San Andres, while prospect in east portion of county has show of gas; high well in Brunson field will complete from sand in Basal Ellenburger; isolated wildcat in Union County logs gas show.

Lea County: Devonian Oil Company's Browne-Federal 1, NW NW 19-9s-38e, 42 miles from production in New Mexico and 13 miles northwest of production in West Texas, was setting pumping unit to complete from open hole at 4926-5011 feet in San Andres, topped at 4230 feet with elevation of 3969 feet. Third-stage treatment with 10,000 gallons of acid developed a brief oil flow, and the well later swabbed 10 barrels of oil and 1 barrel of water hourly. A commercial pumper is assured. The San Andres marker correlates 3 feet high to a 5658-foot failure 2 miles south by west, and the latter almost qualified as a pumper. A large producing area, but subnormal in crude yield per acre is in the making.

The Texas Company's Garrett 1, C NE SE 22-16s-38e, 1¼ miles northwest of the company's Eaves 1, recent 10,085-foot Basal Permian failure, confirmed its favorable structural position in recovering 65 feet of slightly oil- and gas-cut mud when tester was used in the San Andres at 5280-5370 feet. It was coring at 5385 feet.

Amerada Petroleum Corporation's Brunson 7, SE NE 4-22s-37e, northeast edge of the Brunson field, entered the Ellenburger at 7421 feet, highest for the field, with dolomite pay to 7604 feet followed by oil-saturated sand to 7631 feet. Granite was reached at 7634 feet, and drilled to 7646 feet, where pipe was set to complete via perforations from the sand. The west offset was completed from the sand, but the north offset to the latter was void of sand in drilling to granite.

Humble Oil & Refining Company's Leonard-Federal 1, first Ellenburger producer for the state and discovery of the Dublin area, has been depleted and abandoned after producing about 20,000 barrels of oil and a greater volume of water.

Sun Oil Company's McKinley 1-B, northeast edge of the Hobbs field and first deep test for the area, was awaiting orders to abandon after recovering 5030 feet of sulphur water in Basal Permian at 7920-8010 feet.

Union County: The Pure Oil Company's Wiggins Unit 1, NE NE SE 13-31n-36e, 18 miles north by east of Moses, attracted attention through having recovered 570 feet of gas-cut mud when tester was used at 2704-74 feet. It was drilling at 2840 feet, and will explore the Ordovician beds. The company holds a large block of supporting leases on this geophysical prospect.

☆ West Texas

Hale County Has Important Pennsylvanian Discovery

Hale County yields important oil discovery from Pennsylvanian; northeastern Ward County wildcat will set pipe to try for completion in Silurian; Block 31 field extended ½ mile southwest.

Hale County: Stanolind Oil & Gas Company's Fisher 1, C SW SW E.L. & R.R. 5, Block CL, established the first production for the South Plains Basin in flowing 558 barrels of 38.5-gravity oil, gas-oil ratio 400/1, on 16-hour gauge through 12/64-inch choke after using 2500 gallons of acid. The well averaged 45 barrels of oil hourly the last 2 hours prior to shutting in to move out rotary. This production is from open hole at 6895-992 feet in Pennsylvanian, topped at 6885 feet with elevation 3316 feet. It is 19 miles east by north of the Irish 5800-foot Clear Fork field, nearest production, while nearest Pennsylvanian oil involves the Bateman field, King County.

Stanolind controls all leases within a mile of its strike, and will be given a direct pipe line connection shortly, as Stanolind Pipe Line Company's 16-inch carrier to Oklahoma cuts across the southeast corner of the county. Nearly all leases in the area will require development in 1948, beginning in January. The oil has been tentatively classed as typical Mid-Continent grade.

Ward County: Stanolind's Sealy-Smith 14, C SW SW G&MMB&A 3, Block A, 2 miles east of Ellenburger production in the Monahans field, was plugging back from 9016 feet to set pipe and try for completion in the Devonian and Silurian, topped at 8148 feet and 8575 feet, respectively. The Devonian correlates 578 feet low. The company has authorized the drilling of west and southwest offsets due to lease obligations on its original 31,770-acre lease, which has been reduced by 10 semi-

EVER BEFORE!

EVER BEFORE!

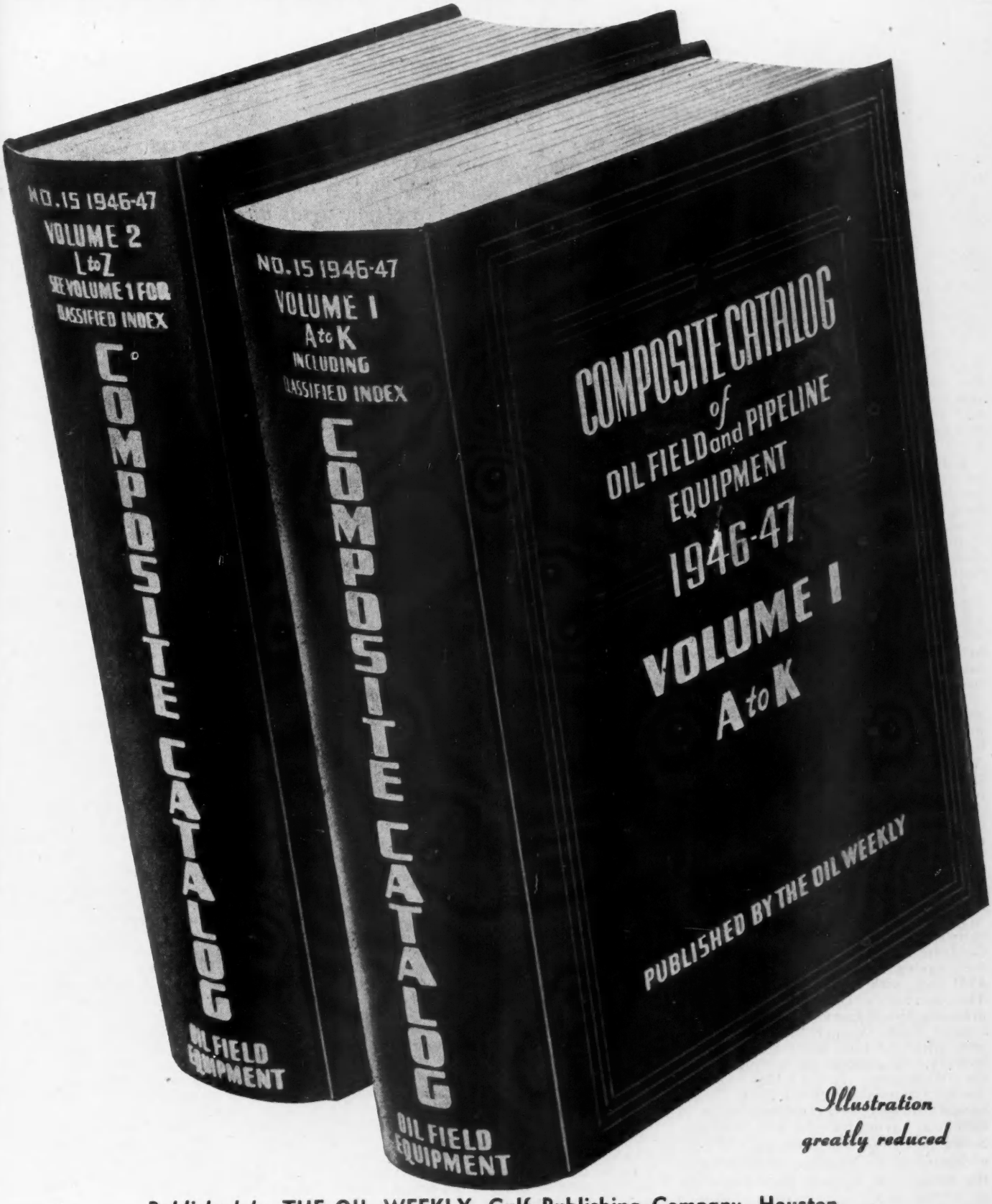

Illustration greatly reduced

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shallow and deep failures in recent months.

Crane County: Phillips Petroleum Company's University 1-P, ½ mile west of southerly production in the Block 31 2-pay field, flowed 423 barrels of 41.3-gravity oil, with gas-oil ratio 1375/1, natural, through 19/64-inch choke from perforations at 8650-8875 feet in Devonian, topped at 8140 feet, or 139 feet low. The field has 22 Devonian wells, including 10 that were dually-completed from the Ellenburger. All are on 160-acre sites, but the University may insist upon closer development.

Gulf Oil Corporation's University 1-HH, 3¾ miles north by east of the Block 31 field and involving a separate structure, was drilling lime and chert at 9037 feet in Devonian, topped at 8390 feet. This wildcat has indicated probable production from the Devonian.

Winkler County: Sun Oil Company's Wheeler 2-A, north end of the Wheeler field and structurally low, failed to flow after acidizing Devonian perforations at 8542-98 feet, and will perforate higher. Sunray Oil Corporation's Wheeler 2, southeast offset, entered the Devonian at 8641 feet, below the water level established by producers, and was awaiting orders in barren Silurian at 9535 feet.

Standard Oil Company of Texas' Baird 26-13, SW SW PSL 13, Block B-3, southwest side of the Keystone field, was swabbing a small volume of oil and acid residue after acidizing new perforations at 5185-5220 feet in Upper Clear Fork.

Ector County: Gulf's Goldsmith 421-E, which has confirmed commercial oil production for the Devonian, topped at 7975 feet, with water at 8055 feet, was drilling lime and chert at 8435 feet. The Pre-Permian beds logged by this well indicate structural conditions somewhat similar to the TXL multi-pay field.

Shell Oil Company and Arkansas Fuel Oil Company's Slator 1-D, near C NE SE T&P 1, Block 46, ⅜ mile northwest of Devonian production in the TXL field, was drilling at 7920 feet in Devonian, topped at 7870 feet, or about 70 feet high to the nearest producer in this zone. This favorable structural position emphasizes the possibility of Devonian production continuing northwest and bypassing a failure on the west.

Crockett County: Stanolind's University 1-TT, ½ mile north of its inactive prospective gas-distillate discovery, was drilling dolomite at 8585 feet in Ellenburger, topped at 8085 feet. Drill-stem test at 8450-95 feet returned 4500 feet of sulphur water to eliminate the Ellenburger as a source of production. It is due to continue to granite to check geophysical information.

Wildcats: Phillips Petroleum Company's TXL 1-M, 1¼ miles west of the Goldsmith field, was drilling lime at 6665 feet, having entered the San Andres at 4300 feet with elevation of 3263 feet. The company's University 1-B, Pyote prospect, Ward County, was drilling out cement from 5½-inch casing at 10,510 feet, with the hole bottomed at 11,996 feet. It will attempt to complete from the Wolfcamp. In Winkler County, Amon Carter's Wight-Gulf 1, Ellenburger prospect, was drilling shale at 9680 feet, having tested dry at 9444 feet. Santa Fe Petroleum Company's Wheeler-Magnolia 1, 2⅞ miles northwest of the latter, was drilling lime and chert at 10,680 feet, having entered barrel Fusselman at 9975 feet.

☆ North Texas

Throckmorton Semiwildcat Has Flow of Oil from Bend

Throckmorton County semiwildcat makes oil flow from Bend; southwestern Young County wildcat shows promise of oil strike; Wilbarger County has deep failure.

Throckmorton County: Conrad Sztygold et al's King 1-B, NW SE Sect. 3, AB&M Survey, and 1½ miles west by south of an isolated 4650-foot bend flowing discovery, was preparing to complete through perforations after flowing oil from conglomerate in basal bend at 4988-5005 feet. Some water was reported in pulling drill pipe. The well was deepened to 5145 feet in Mississippi, topped at 5080 feet. Top of the Bend was called at 4527 feet, or about flat with the nearest producer, and test at 4539 feet yielded 180 feet of gas-cut mud from this lime zone.

Young County: Warren Oil Corporation's Martin 1, M. DeWitt Survey and 1⅓ miles west of the Kendall field, was drilling at 3570 feet to explore the Ellenburger after recovering oil-cut mud in Bend at 3523-31 feet, and a test at 3536 feet yielded oil-cut mud and considerable water. This test may prove to be on the west side of the Kendall structure.

Wilbarger County: The Texas Company's Hause 1, Wm. Alston Survey and 2 miles southeast of Oklaunion, established the presence of a deep syncline, and was abandoned in Ellenburger water formation at 7800 feet. The company's Robertson in north offset to the Tolbert pool discovery, failed to register commercial production after acidizing Pinto perforations at 5024-60 feet. Amerada Petroleum Corporation's Inglish 1, west offset to the producer, developed water after acidizing west perforations opposite the lower pay at 5075-91 feet, and was swabbing 5 barrels of fluid hourly, including 16 percent water, from perforations at 5039-69 feet. The latter perforations were open when the lower zone was tested, and the water is expected to be exhausted.

Collin County: Standard Oil Company of Texas' Newsome 1, Frisco prospect, was drilling shale at 7440 feet. This wildcat precipitated in active royalty play when minor oil showings were encountered in the Upper Strawn. Humble Oil & Refining Company's Wester 1, also an Ellenburger project, was drilling at 3740 feet.

Co-Op Tax Matter Unlikely To Be Discussed This Year

Revival of the House Small Business Committee, sought by the small-business bloc, will mean a new review of the tax and other advantages held by co-operative associations, on which last session Representative Wright Patman of Texas, then chairman, issued a "yes and no" report, in which he held the co-ops had no important advantages and if they did they were of no consequence.

No such report would emanate from the committee if revived this session, for Representative Walter C. Ploeser of Missouri would be chairman and Ploeser last year differed sharply with Patman over the latter's findings, pressing the issue so hotly that Patman failed to follow up with a final report.

Meanwhile, the pressure continues to grow for action to put the co-ops more nearly on a level with other business, and the small business advisory group of the Department of Commerce has recommended that they be subject to the same tax burdens as any other form of commercial operation.

There is little likelihood that any definite action along this line will be taken this year, since time and the congressional program will not permit much legislation on taxes beyond the income and excise changes being mapped out by Republicans, but the long promised overhauling of the revenue laws may come next year and the subject then will be considered seriously.

☆ East Texas

Anderson County Semiwildcat Has Blowout Above Woodbine

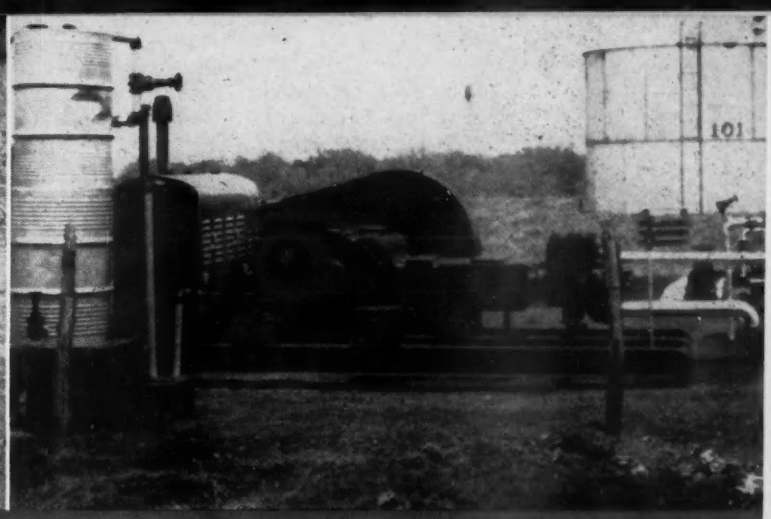
Anderson County semiwildcat has gas blowout above Woodbine; Flynn field extension to make commercial pumper; Lindale prospect is barren in Woodbine.

Anderson County: Blue Bird Investment Company's Pearson 1, John Gossett Survey and 5 miles southwest of Elkhart, blew out as a gasser after losing rotary returns in unidentified formation, possible sub-Clarksville, while drilling at 5040 feet. Top of the Pecan Chalk was called at 4110 feet, with elevation 324 feet. This well is a mile north of H. L. Parsons et al's Hemby 1, which was completed in 1938 as a gas-distillate discovery from perforations at 5409-19 feet in Woodbine, topped at 5360 feet with elevation 263 feet.

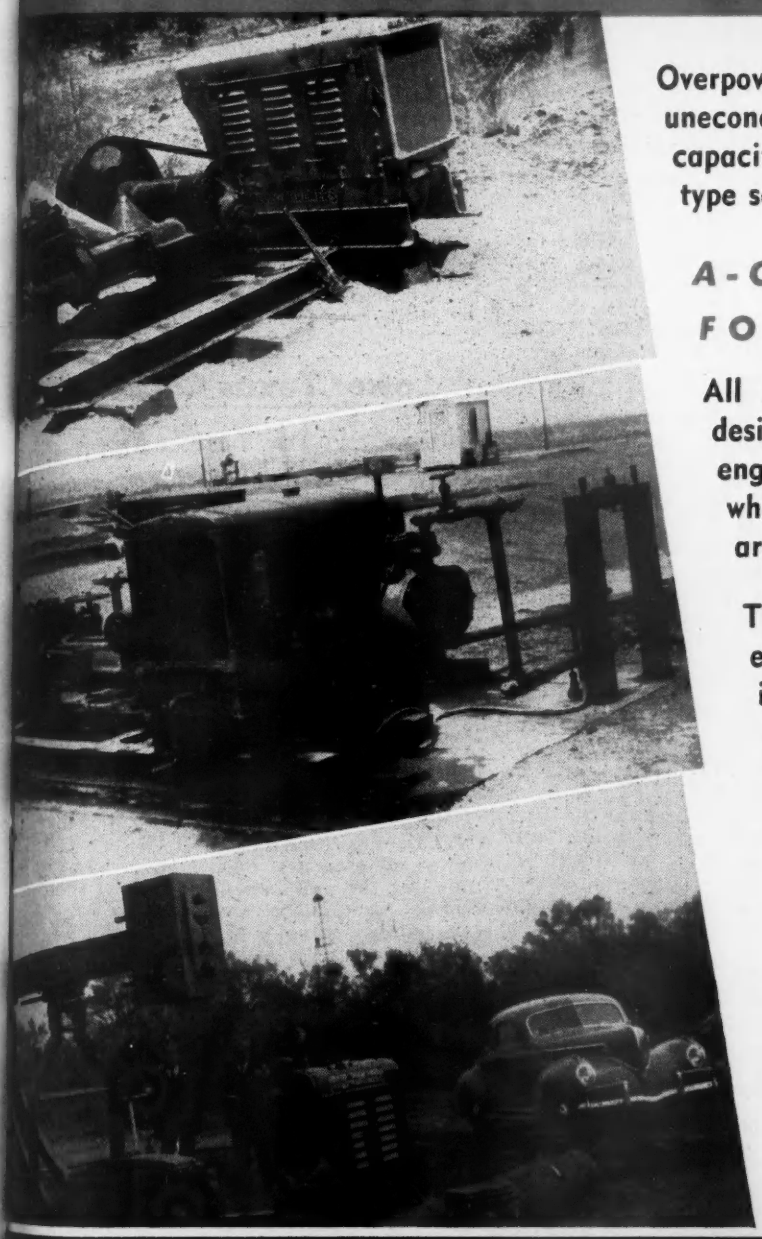
Smith County: Delta Drilling Company's Lyons 1, Jesse Benton Survey and a Paluxy prospect for the Lindale structure, failed to indicate production in drilling Woodbine to 5680 feet. Base of the Austin chalk was called at 4915 feet, with elevation 536 feet, indicating high structural position when correlated with nearest failures. In the Mount Sylvan pool, Humble Oil & Refining Company's Dowell 2, northeast outpost and a failure in the Paluxy, was drilling at 7475 feet, and may try for deeper pays if the Glen Rose marker is found high.

Cherokee County: Standard Oil Company of Texas' New Birmingham 1, indicated Rodessa gas-distillate discovery, continued to test the Travis Peak at short intervals without results. A drill-stem test was being made of new perforations at 9877-9908 feet.

Leon County: Tex Harvey Oil Company's Powell 1, John Scritchfield Survey and 3300 feet southeast of the small flowing confirmation well for the Flynn field, cemented pipe at 7110 feet to complete from open hole after drilling through the Woodbine to 7454 feet, or 11 feet in the Buda lime. Pecan chalk was logged at 5393-530 feet and Austin at 6392-680 feet, according to electrical formation survey. The Sub-Clarksville-Woodbine contact does not register in this area due to the latter being predominately shale and sandy-shale, with minor streaks of oil-saturated sand. Powell 1 is 83 feet low on base of the Austin and 46 feet low on the Buda when correlated with Daniel Oil Company's flowing well on the Cox 220-acre tract. United North & South Development Company's Oden 1, W. Martin Survey and 1⅓ miles northwest extension, was equipping to pump after flow-



Allis-Chalmers Power Engines — a Size to SUIT the Job.



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FRED E. Cooper

Hale Station, TULSA, OKLAHOMA

ing occasional heads of oil from Woodbine perforations at 7195-7235 feet. It was plugged back from Edwards at 8112 feet.

Freestone County: The Texas Company's White 1, west outpost for the Fairfield gas area, stuck drill pipe 35 feet off bottom when in lime at 13,508 feet. Fishing was under way after cutting the stem at 8347 feet, and recovering the top portion.

Rusk County: Tide Water Associated Oil Company and Seaboard Oil Company's Bird 1, Jas. McClain Survey, was drilling at 7240 feet to establish the water level in the Travis Peak, topped at 7115 feet, before plugging.

Bowie County: Barnsdall Oil Company and Sohio Petroleum Company's Greenwood 1, L. T. King Survey, A-327, East Eylau prospect, entered barren Travis Peak at 5240 feet, and was drilling at 6230 feet on Smackover objective.

Manziel Prices Revised

The Pan American Production Company has announced an adjustment in its posting for crude oil purchased in the Manziel field, Wood County, East Texas, by lowering the price 10 cents per barrel and setting up a separate schedule. Crude purchased in this field by Pan American was formerly listed on the same schedule as the Quitman field in the same area.

The new schedule, effective at 7 a. m. February 1, is below 18-gravity, $1.21 per barrel, with a two-cent differential for each degree of gravity upward to a top price of $1.37 per barrel for 25-gravity and above.

Producing Property Sold

Hollandsworth Drilling Company has acquired S. D. Johnson's 55 percent interest in 3 shallow leases in the Gatewood field, Cooke County, Texas, for $165,000, half cash and the remainder in deferred payments. The properties involve the Gatewood, Otto and Trubenbach leases, consisting of 850 acres with 38 pumpers. Alco Valve Company retained its 45 percent interest.

Murray Sworn in

William J. Murray, Jr., of Houston took the oath of office as Railroad Commissioner of Texas January 28 to fill the unexpired term of Governor Beauford H. Jester.

☆ East Texas Border

Carthage Gas Field Is Given 7000-Foot North Extension

Carthage field extended north; acid treatment makes major gas producers of most Whelan gas wells.

Panola County: The Carthage gas field has been extended 7000 feet north of Skelly Oil Company's Lewis Werner Sawmill D-1 producer with completion of Continental Oil Company's G. W. Bird 1, Sarah Harrell Survey. The well failed to get Lower Pettit or Travis Peak production, and was completed in the Hill and Upper Pettit zones, flowing 9 million and 80 million cubic feet of gas daily after both horizons were acidized.

Harrison County: Whelan field gas producers were treated with acid and showed a major improvement of 1000 percent increase on open flow tests in 4 out of 5 gassers. Rogers Lacy's B. C. Quinn 1, V. Gibbs Survey, after treatment with 4000 gallons of acid jumped from first open flow potential of 60 million cubic feet in the Rodessa pay to 660 million cubic feet. The well now ranks second to only one of the Carthage field producers.

Marion County: Magnolia Petroleum Company's Hall 1, Moody Survey, Lassater field, yielded gas odor in hard rock in a 1-foot core recovery at 9094-95 feet. This is about the same level at which production was established in the Orr 1 discovery last year. Drilling will be carried to 10,000 feet. A successful completion will extend the 1-well deep Lassater field a mile north.

Shelby County: B. F. Phillips' Pickering 1, wildcat, in the G. Russell Survey, 3 miles north of Shelbyville, has experienced little success in efforts for completion as an oiler from the Pettit at 6510 feet. The hole may be drilled about 25 feet deeper, then cleaned and acidized.

☆ Southwest Texas

New Pay Tested in La Reforma Southeast Outpost Discovery

New pay zone being tested in La Reforma southeast outpost discovery; dry hole plugged in Starr County; new well completed at San Jose; wildcat near Cuellar field plugged.

Starr County: Baldridge & King's Guerra 1-B, outpost a mile southeast of La Reforma field, is testing another pay zone and may dually complete. Perforations have been made at 6007-18 feet and production tests are under way. Previously, a large flow of gas-condensate was tested from perforations at 7294-98 feet and oil was tested at 6046-56 feet but the latter perforations were squeezed when operators could not get a good water shutoff. Total depth is 7505 feet with 5½-inch casing set to 7400. The test is in San Jose Grant A-78.

Dan Auld and W. W. Carter's Lazaro Pena et al 1 has been plugged as a dry hole at 2319 feet with no shows. The dry hole is in Block 27, E. K. Bateman Subdivision of part of the Pedernal Grant.

McMullen County: Dalex Corporation's Kountze & Stewart 3-C has been completed as a new well at San Jose. The well pumped on potential 6 barrels of oil daily, with no water. Total depth is 1183 feet with 5½-inch casing set on bottom and perforated for completion at 1175-79 feet. This well is 990 feet north-northwest of the 2-C well.

Zapata County: Government Wells Oil Corporation's Cuellar Bros. 1, wildcat 30 miles northeast of Zapata, has been abandoned as a dry hole. Total depth is 1342 feet and a sand with oil and gas odor at 1226-37 feet was tested, but the test failed to make a recovery. The hole is a mile west of Cuellar field.

☆ South Central Texas

Atascosa County's Jourdanton Field Extensively Enlarged

Jourdanton field extensively enlarged; Ellenburger to be tested in Edwards County wildcat; second well in Zavala County discovery area shows for production.

Atascosa County: Jourdanton field has been extensively enlarged by 4 tests. On the southern edge of the field Plymouth Oil Company's Powell 2, offset to the Powell 1 oiler, has been completed at 7396-408 feet through open hole as a gas well. Seaboard Oil Company's Tudyk 1, west offset to the Powell 1, has been completed through open hole at 7405-10 feet as a gas well. Humble Oil & Refining Company's SPSJA Lodge 1, 2 miles west of the main part of Jourdanton field, flowed 90 barrels of 39.4-gravity oil and 695,000 cubic feet of gas daily through open hole at 7388-92 feet. Midway between the Humble well and the field Magnolia Petroleum Company's Nixon & Steinle 1 has been completed for 30 barrels of 38-gravity oil daily through open hole in the Edwards lime at 7368-84 feet. The Magnolia well is 1400 feet south-southwest of Humble's Sandeen 1, previous extension for the field.

Edwards County: Ray Pool's Peterson 1, wildcat 20 miles north of Rock Springs, is preparing to test the Ellenburger lime. Total depth is 4900 feet and 5½-inch casing is being set to 4350 feet. Cable tools are being moved in for the test. The Ellenburger was topped at 4425 feet and will be acidized. This wildcat is in W½ N¼ Sect. 44, M&E RR Survey.

Zavala County: The Texas Company's Cross Ranch 1 (tract 2), 6 miles northwest of Crystal City and 1350 feet southeast of the company's Northeast Farming Company 1 discovery, is showing for production. A drill-stem test at 3304-14 feet recovered 500 feet of oil in 30 minutes through ¼-inch chokes with 35 pounds working pressure. Total depth is 3334 feet with 7-inch casing set to 3303 feet. The company's Northeast Farming Company 1 has not been completed, at present being shut in waiting on storage after flowing 19-gravity oil.

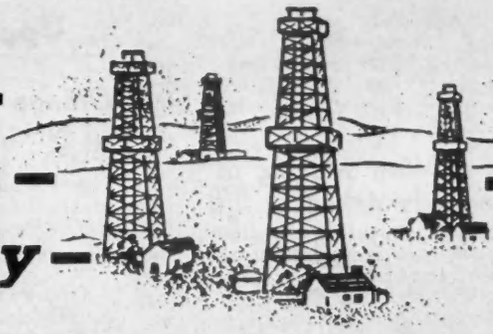
☆ Lower Texas Coast

Matagorda Bay Test Is Likely New Oil Field Discovery

New field likely in Matagorda Bay; Atlantic wildcat in Kenedy County shows for production; new oil pay discovered in Agua Dulce northeast extension area; another new pay tested in Stanolind's Live Oak wildcat.

Calhoun County: The Texas Company et al's State 1, wildcat in Matagorda Bay near the Matagorda County line, showed oil on initial production tests and is a prospective new field discovery. Drilled to 11,530 feet, 7-inch casing that had been set to 10,072 feet was cut and pulled and hole plugged back to 5278 feet within the 9⅝-inch casing. Casing was then perforated at 4970-78 feet and on a drill-stem test open 2 hours and 27 minutes, the well flowed, through ¼-inch chokes top and bottom, the 1050-foot water cushion and 42 barrels of 26.3-gravity oil with bottom-hole pressure 2125 pounds open and 2170 pounds closed.

Kenedy County: The Atlantic Refining Company's McGill 1, wildcat in the northwest corner of the county, is a prospective new pool opener. Drilled to total depth of 9905 feet, 5½-inch casing was set to 9904 feet and all tests made at deep levels failed. The 5½-inch was then pulled and the 9⅝-inch casing, set to 7998 feet, was perforated at 7676-80 feet for a test. A drill-stem test at this interval, using 1000-foot water cushion, in 2 hours and 10 minutes flowed the



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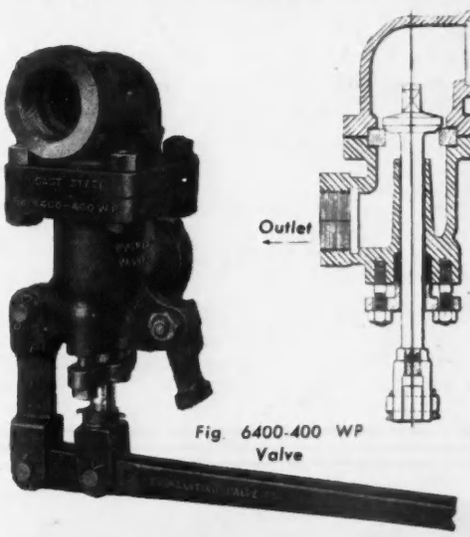
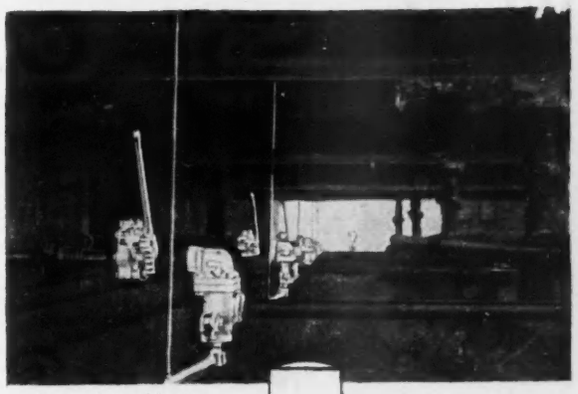
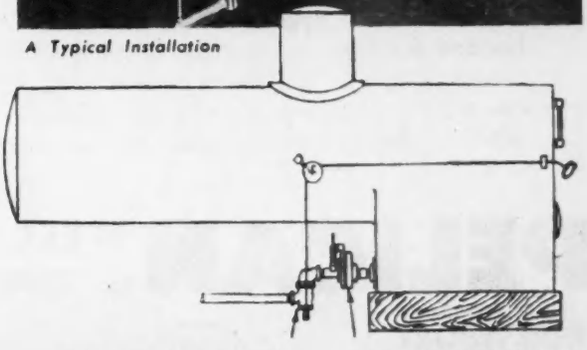


Fig. 6400-400 WP Valve



A Typical Installation



EVERLASTING VALVE Fig. 6400

EVERLASTING VALVE Fig. 1010-350

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water cushion with 120 pounds working pressure on ¼-inch choke, then flowed oil with 500 pounds working pressure. On a change to 5/32-inch choke the well flowed 180 barrels of 39.2-gravity oil daily. When tool was pulled, 4200 feet of oil and 730 feet of salt water were recovered. These perforations were squeezed to shut off the salt water and casing was to be reperforated for completion.

Nueces County: A new oil pay discovery for the Agua Dulce field northeast extension area is L. M. Lockhart's Prochaska 2, located 1320 feet north of the Prochaska 1, northeast extension discovery. From perforations at 6596-98 feet the well flowed 141 barrels of 42.7-gravity oil daily with gas-oil ratio of 6280/1. Flow was through 11/64-inch choke with tubing pressure 1580 pounds, and casing pressure 2400 pounds. Total depth is 6650 feet with 5½-inch casing set on bottom. Prochaska 1 was completed the latter part of 1946 from perforations at 5114-24 feet.

Live Oak County: Stanolind Oil & Gas Company's Pearl Harris 1, wildcat 2½ miles north-northeast of George West, is drilling after testing another gas-condensate pay. A drill-stem test at 7624-32 feet developed 530 pounds working pressure through ¼- and ⅜-inch chokes, open 6 minutes, and recovered 50 feet of condensate cut mud and 5 gallons of free condensate. Another drill-stem test at 7370-80 feet developed 500 pounds working pressure in 9 minutes and recovered 50 feet of gas-condensate cut mud with bottom hole pressure of 2950 pounds open and 3300 pounds closed. A test at 7409-13 feet developed 50 pounds working pressure and recovered 55 feet of 36-gravity oil and 50 feet of oil- and gas-cut mud. A test at 7415-21 feet flowed 10 percent oil and 90 percent salt water with 250 pounds working pressure in 45 minutes. The well is drilling below 7704 feet.

Repeal of Well Spacing in Oklahoma Is Asked in Bill

An outright repeal of Oklahoma's oil well spacing law is sought in a bill introduced in the state senate by Senators Homer Paul of Pauls Valley, chairman of the senate committee on oil and gas, and James C. Nance, Purcell, president pro tempore.

The bill seeks to repeal Chapter 3, Title 52, page 155, Session Laws of Oklahoma, 1945, relating to the conservation of oil and gas.

General Order No. 19,334, which prescribes rules and regulations for drilling, completion and production of oil and gas wells in Oklahoma, issued by the Corporation Commission is entirely dependent on the law which the new senate measure seeks to repeal, according to conservation officials.

However, it is believed that the laws now before the legislature will become the basis for a new law to give the Corporation Commission continuing jurisdiction over spacing cases, with authority to change the size drilling pattern whenever additional evidence discloses advisability for such action.

Senator Paul, in a bill previously introduced to the legislature, asked straight 10-acre well spacing in all Oklahoma pools discovered during the past three years, and in all pools which may be discovered in the future.

☆ Upper Texas Coast

Orange County Has Discovery In North Port Neches Area

Hinkle opens field in Orange County; Humble sets casing for production tests in Humble dome and Sandune explorations; producer finaled at Sugar Valley; discovery allowable asked for Tidehaven South.

Orange County: A new field discovery is Hinkle Drilling Company's Miller-Vidor Land Co. 1, wildcat on a Gulf farmout 9 miles north and a little west of North Port Neches field, a Hinkle discovery made in September. On initial test the well flowed gas and condensate through ⅛-inch choke with 2800 pounds pressure. Total depth is 7910 feet with 5½-inch casing set to 7810 feet and perforated for completion at 7772-78 feet in Hackberry sands. Separators were being erected following initial tests in preparation for the potential gauge.

Harris County: Humble Oil & Refining Company set 5½-inch casing to 5238 feet in the J. C. House 2, outpost on the north flank of Humble dome. Total depth is 5652 feet and casing has been perforated at 5022-30 feet for production tests. This is the third exploration on the north flank made by Humble in less than a year. The other 2 were dry holes with no shows.

Liberty County: Humble has set 5½-inch casing to total depth of 10,336 feet at John Tarlton Trustee 1, wildcat in the Sandune district, Alexander Taylor Survey, Abstract 362. The test is 5 miles west of production in Hull field.

Matagorda County: Union Oil Company of California's Helen Hurlock et vir 2 has been completed as a new producer at Sugar Valley field. The well flowed on potential 108 barrels of oil daily through 7/64-inch choke with gas-oil ratio 574/1. Total depth is 9021 feet with 5½-inch casing set a foot off bottom and perforated for completion at 9007-13 feet in a sand topped at 9001 feet.

Johnston & Johnston have applied to the Railroad Commission for discovery allowable for Surkamp 1, 9700 feet south of Tidehaven field. The well has been completed from sands topped at 8530 feet and total depth is 10,055 feet. It was taken over from The Ohio Oil Company several weeks before completion. Operators have asked that the field be called Tidehaven South.

☆ South Louisiana

Once-Abandoned Four Isle Field Is Given Producer

Producer being completed in once-abandoned Four Isle field; new well being completed at Weeks Island; Longville discovery area confirmation drills below discovery level; Holmwood wildcat is below 11,216 feet; wildcat northeast of Mud Lake is below 11,522 feet.

Terrebonne Parish: The Superior Oil Company's Louisiana Land and Exploration Company 3 is being completed as a producer in the once abandoned Four Isle dome field, 24-21s-16e. On initial tests the well cleaned at the rate of 80 barrels per day, showing wash water and mud with 41-gravity oil and a small amount of gas. Total depth of the hole is 9503 feet in salt topped at 9457 feet, and 7-inch casing is set to 9228 feet and per-

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forated at 8978-94 feet. The Four Isle field, discovered in 1935 by The Texas Company's LL&E Company 8, has not produced since 1938. A total of 283,162 barrels of oil was produced from the field, 227,893 barrels of this amount being produced during the first year of discovery.

Iberia Parish: Shell Oil Company is completing the Myles Salt Company 1 as a new producer at Weeks Island field, site of the world's deepest producer. On initial test the well flowed 446 barrels of 33-gravity oil daily through 10/64-inch choke with gas-oil ratio 1253/1. Total depth is 12,415 feet with casing perforated at 12,380-95 feet for completion. This new well is 853 feet south and a little west of the Smith-State 1, discovery for the field.

Beauregard Parish: Barnsdall Oil Company's Long Bell Lumber Company 2, confirmation test in the Longville discovery area ¼-mile northwest of the discovery well, 1-6s-10w, is drilling below 8528 feet, below the discovery level. A drill-stem test was attempted at 8301 feet but packer failed. The discovery was completed from Cockfield sands topped at 8228 feet.

Calcasieu Parish: Sohio Petroleum Company's Farmers Land & Canal Company 2, wildcat in the Holmwood area, 26-10s-7w, is below 11,216 feet. Sands with gas-condensate and oil shows have been found in this test at the 10,300- and 10,700-foot levels. The test is about 5 miles west-southwest of Bon Air field.

Cameron Parish: Magnolia Petroleum Company's Lutcher 1-C, wildcat 4 miles northeast of Mud Lake field credited with gas-condensate shows, is below 11,522 feet. Sands with shows were located at 9000-, 9200-, 10,100-, and 10,400-foot levels.

☆ North Louisiana

Second Hico-Knowles Field Producing Well Is Assured

Second Hico-Knowles producer assured; Madison Parish wildcat preparing to test; Winn Parish wildcat plugging back.

Lincoln Parish: Southwest Gas Producing Company's W. W. Farley et al 1, C NE SE 23-120n-4w, logged 100 feet of gas-distillate sand in the Cotton Valley to insure a second producer for the Hico-Knowles field. Exact interval of the saturation was not revealed, though a core from 8394-8414 feet was reported to have recovered 17 feet of sand showing gas and distillate. Drilling continues below 8565 feet.

Madison Parish: Curtis Kinard's Ayer Timber Company 1, C NW SW SW 19-15n-10e, will take production test. Total depth is 6432 feet, with 5½-inch production casing cemented at 5787 feet. Soft sand of the Tuscaloosa was drilled at 5632-37 feet and sand showing gas recovered on a core at 5637-41½ feet.

Winn Parish: H. L. Hunt et al's Goodpine F-136, wildcat in 21-10n-2w, 3 miles north of Packton, was testing after plugging back from 5965 to 5800 feet. Total depth is 6432 feet. Latest drill-stem test recovered fresh and brackish water. Operators still hope to complete the test successfully, since it would open a new producing area and indicate a trend of possible production from Winn Parish into the Big Island field of Rapides Parish.

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☆ Arkansas

Wildcat in Columbia County Opens Warnock Springs Field

Wildcat completion in Columbia County opens Warnock Springs field; further showings found in West Lewisville offset test.

Columbia County: McAlester Fuel Company's Warnock Estate A-1, in NW SE 6-17-19, recently completed wildcat as a gas distillate well five miles northeast of Magnolia, opened a new field designated the Warnock Springs field. The test, initially producing 58 barrels daily, has been granted an allowable of 100 barrels, which is expected to be obtained through larger choke. The increased production is contingent on utilization of the gas estimated at 1½ million cubic feet daily.

Lafayette County: H. F. Briley's Owen 1 C NW SW 16-16s-24w, south offset to the Glen Rose discovery of the West Lewisville field, is drilling below 3926 feet in Massive Anhydrite. Previously, oil saturation was found in 2 Tokio sands, and last week the well entered the Paluxy formation at 2940 feet and logged broken oil sand from 3240-88 feet. No drill-stem tests have been made, but sufficient saturation has been logged to make it likely that the well will complete from a different horizon than others in this sector of the county.

☆ Mississippi

Another Brookhaven Field Outpost Nears Completion

Another Brookhaven outpost on verge of completion; Jones County prospect continues to receive encouragement.

Lincoln County: Crescent Drilling Company's J. F. Vernon 1, SEc 31-8n-7e, ¾-mile northwest of production in the Brookhaven field, was preparing to complete on pump. Lower Tuscaloosa was perforated at 10,467-90 feet with 138 shots and the well swabbed down to 5000 feet. Present production on pump is only at the rate of 144 barrels a day, 22 percent salt water. The California Company's J. F. Vernon 1, SEc 31-8n-7e, 8-7n-7e has been completed for one of the best producers in Brookhaven with an initial production of 469 barrels of 34-gravity oil per day through 11/32-inch tubing choke. The well encountered a 102-foot section of saturated sand in the lower Tuscaloosa-Massive sand zone, but was unable to establish flow until acidized. Thereafter casing was perforated in 2 sections at 10,267-85 and 10,-292-358 feet to develop production.

Yazoo County: The Carter Oil Company's Carl Day 1, wildcat, is running core tests below 6970 feet. Cores at 6945-65 feet recovered clean sand with good porosity. As a result of the shows of oil encountered in the Tuscaloosa zone, Don Reese' Fouche 1, NEc NW NE 22-12n-1w, will resume operations. The well was abandoned at a total depth of 6505 feet last year after topping the Tuscaloosa at 6440 feet, with no shows reported at any point along the hole. Contract now calls for it to be driven another 1000 feet in order to further explore the zone in which the Day encountered its shows.

Jones County: Gulf Refining Company's L. L. Majors 1, SEc NE 29-6n-11w, wildcat which has shown commercial possibilities in the Tuscaloosa horizon, continues with core tests in the vicinity of 8500 feet. Cores at 8490-92 feet showed slight stain. Cores at 8492-97 recovered fairly porous sand with good saturated and a section at 8499-500 feet also had shows of oil.

Amite County: Gulf Refining Company's J. A. Rowland A-1, SWc NW 39-4n-2e, extreme southwestern section of the state, is drilling below 10,750 feet with no shows. Lower Tuscaloosa has been extensively cored and cores taken at 10,723-744 feet recovered sandy lignite shale.

Forrest County: The Superior Oil Company's Maria Draughn 1, NEc 12-3n-13w is drilling below 2567 feet with no shows reported. The well is about a mile southeast of Cassie Bradford 1, drilled to more than 14,500 feet. No information has been released on findings obtained from the Bradford.

Smith County: Woodley Petroleum Company's Womack-Butler Unit 1, SWc NW SW 36-1n-6e, wildcat, is drilling below 6537 feet after topping chalk at 5979 feet. The area was the scene of extensive activity in 1945 but fell off to 2 tests last year after no encouragement had been obtained from any of the operations. With more detailed information available, activity should be much greater in the next 12 months.

Alabama

The Carter Oil Company's F. M. Moseley 1, C SW NW NW 3-10n-3w, Gilbertown field, Choctaw County, has encountered 17 feet of saturated soft sand and oil in the Eutaw section at 3175 feet. No input of salt water is reported. The well has drilled to 3198 feet.

Florida

Gulf Refining Company's State 1, 2-67s-29e, Monroe County deep test, is drilling below 14,401 feet in anhydrite and streaks of dolomite lime with no shows reported at recent low levels.

☆ Ohio

Symmes Township, Lawrence County, Has Large Gas Well

Symmes Township has large gas well; Bridgville has first gas completion; Mifflin extended west; Coshocton wildcat is near failure.

Lawrence County: Ohio Fuel Gas Company moved in between its Moulton and Cole wells to complete a good gasser on Irish and Riley 3, SW SW 19, Symmes Township. A thick Clinton sand was found at 3157-87 feet and gauged 2,375,000 cubic feet natural.

Muskingum County: The Bridgville Oriskany sand oil pool has its first gas completion. Atha Realty Company's Forrest Hamilton 1, NE SE 12, Perry Township, reached the top of the sand at 3012 and 3015 feet. Drilling was stopped when the well gauged 825,000 cubic feet with a rock pressure of 820 pounds.

Ashland County: The sand continues to thicken slightly to the west in the Mifflin gas pool, resulting in 1 of the best completions yet found. Roy Stewart's Geo. W. Scott 1, SW SW 23, Mifflin Township, gauged 3 million cubic feet natural. Clinton sand came in at 2421-39 feet.

Coshocton County: Ohio Fuel's wildcat on Ethel Crowthers, NW NW 9, Perry Township, had a small showing of oil in the Clinton, 3094-148 feet, which was shot. The well did not respond and is making only 8 barrels. Operator is undecided about producing it.

☆ Illinois Basin

Clay County, Illinois, Test Extends Production 1½ Miles

Clay County Illinois, has McClosky lime producer 1½ miles north of production; test in city of Mattoon abandoned; North Owensville pool, Gibson County, Indiana, extended.

Clay County: National Associated Petroleum Company's Hickle 1, SE NW NE 33-3n-7e, 1½ miles north of production at Clay City, has been completed for 225 barrels of oil and no water in McClosky lime.

Phillips Petroleum Company's Spiker 1, NE SE SW 23-3n-5e, 1½ miles northeast of the Kenner pool, swabbed 83 barrels of oil in 24 hours from Cypress sand at 2585-95 feet, and continues testing.

White County: Great Lakes Carbon Company's Calvert 1, SE NE NW 4-7s-10e, has set 7-inch pipe for test of McClosky at 2970-75, 2990-95, and 3000-05 feet. The well is located ½ mile north of W. O. Allen's Ackerman 1, which is extending the Concord pool south.

Coles County: Joe Blalack's Coles County Locker Plant 1, SW SE SE 11-12n-7e, in the city of Mattoon, has been abandoned after an attempted test of Devonian lime. Total depth of hole was 3211 feet. Some shows were found in the lime, but pipe was lost in the hole.

Indiana

The Superior Oil Company is extending the North Owensville pool with McClosky lime production at Hardiman 2, NW NE NW 18-2s-11w, Gibson County, ½ mile north of present production in the area. The well made 112 barrels of oil in 24 hours during completion tests of pay at 2270-75 feet.

Gasoline Session Set

Friday, Oct. 10, is the date of the California Natural Gasoline Association's 1947 fall meeting. The session will be held at the Ambassador Hotel in Los Angeles.

☆ Michigan

Lake County Wildcat to Drill Deeper After Testing Water

Sohio Petroleum Company's Wilson 1, NE SW NE 20-19n-11w, Lake County, one of the top interest Michigan wildcats, logged Dundee dolomite at 3406 feet and tested salt water at 3418 feet. Casing will be reset to test Upper Monroe, which will require about 100 feet of additional hole.

Oceana County: The Carter Oil Company's Miller 2, NE NW NE 14-13n-18w, 1320 feet south of the Claybanks Township Traverse discovery (1631 feet) well, showed sulphur water on a drill-stem test at 1909-30 feet in Lower Traverse and salt water on a 1-hour

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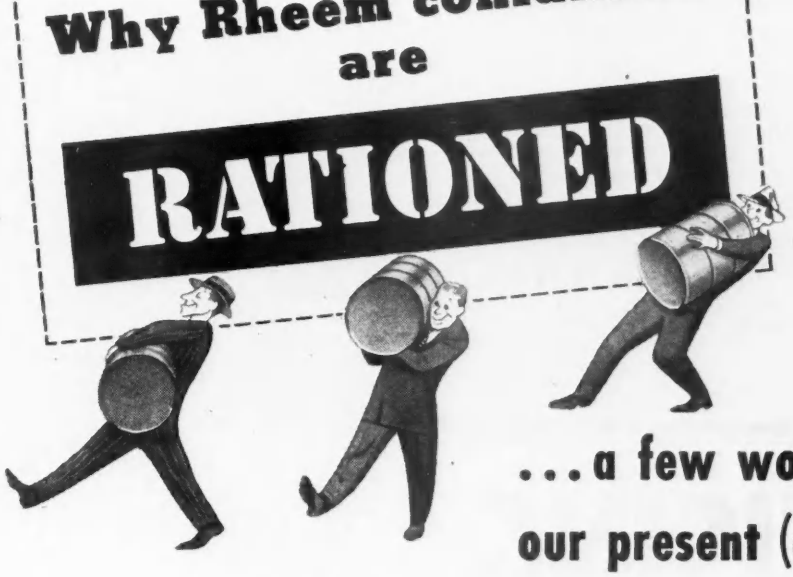

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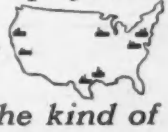
We hope you'll understand. And as more steel becomes available, we hope you'll remember that our seven modern drum plants and our coast-to-coast  *container service can solve your packaging problems by giving you the kind of containers you want, when and where you want them. Rheem, 570 Lexington Avenue, New York 22, N. Y.*

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drill-stem test at 2066-85 feet after topping Dundee lime at 2077 feet. Monroe lime-dolomite was checked at 2130 feet and lacked probable pay at drilling depth of 2186 feet. Failure of the 3 lower zones to show oil pays was disappointing as much of the area's future for important development has been projected on lower zone production. Operator plans to drill to 4200 feet.

Allegan County: Its importance undetermined, Fisher-McCall Oil Company's Bally 1, SW SW SW 17-3n-13w, pumped up to 21 barrels of oil net after acid treatment in Traverse lime pay at 1684 feet. The test is located a mile southwest of the old Monterey pool, developed in 1938. A number of isolated small producers which failed to lead to important field development have been drilled in the same general area.

☆ Rocky Mountain Area

Big Horn, Wyoming, Test Is Disappointment in Frontier

Big Horn, Wyoming, test is disappointment in Frontier; Lakota shows porosity in Fremont County test; Steamboat Butte field has apparent extension; north extension being completed for Rangely field, Colorado.

Wyoming

The Carter Oil Company's Big Horn Basin test in the Five Mile Unit at Unit 1, C NW SW 20-49n-93w, Big Horn County, seems to be a disappointment in the Frontier horizon and may be abandoned without checking lower horizons productive 10 miles south at The Pure Oil Company's Worland Unit field. The Carter test topped Frontier at 9090 feet and is now coring below 9400 feet. Drill-stem tests in the 3 Frontier sands have shown only a small amount of gas-cut mud, and cores through this section have found very hard, tight sand. This well is being drilled on a seismic high along the Worland Unit-South Fork Unit axis, and has run more than 2000 feet lower on the Frontier sand than did the Worland Unit wells. The next possible producing horizon would be Muddy sand, which would probably be below 10,000 feet, and the Embar formation, productive at Worland, would probably be found below 12,000 feet.

Fremont County: At General Petroleum Corporation's Antelope test, 8 miles southwest of the Crooks Gap field, the objective Lakota formation is showing the expected porosity, and there is now question that the well will be drilled deeper. The well is 45-25-G, NE NE SW 25-27n-94w, and is drilling below 10,150 feet in the Lakota. No sample top for the Lakota formation has been released, and electric log probably will be run within the next 50 feet. Muddy formation was topped at 10,045 feet but only a small amount of gas-cut mud was recovered from that horizon.

What appears to be a ½ mile extension of the Steamboat Butte field is being drilled by Brinkerhoff Drilling Company and Sohio Petroleum Company at Tribal 1, NW NW NW 9-3n-1w (WRM), on the south side of the field. The well found the Muddy sand at 4173 feet and on drill-stem test 4205-28, open 51 minutes, recovered 165 feet of green 40-gravity oil.

Uinta and Sweetwater Counties: Two important extension tests to the Church Buttes field are at interesting depths. Mountain Fuel Supply Company's Well Unit 2, NE NE NE 22-17n-112w, 5 miles northeast of the discovery, is drilling below 10,420 feet and Unit 3, SW NE SW 12-16n-113w, 1 mile west of the discovery, is below 10,150 feet. These operations are carried as tight holes insofar as formation tops are concerned, but both should soon find Frontier sand. Church Buttes was a discovery early in 1946 with a well drilled to 12,876 feet and completed for an estimated 100 million cubic feet of gas with 500 barrels of 42-gravity oil in the Lakota. One of the 2 present operations may be drilled into the Sundance below 13,000 feet.

Colorado

Phillips Petroleum Company and Stanolind Oil & Gas Company are completing an extension on the north side of the Rangely field at Associated "C" 1, C SE SW 12-2n-103w. The well is flowing by heads through open tubing and is estimated good for 150 barrels of oil per day. Weber was topped at 6527 feet and the well drilled only 71 feet of Weber sand. Continental Oil Company continues deepening its 2 probable dry holes on the west side of the field at Rooth 3, C NE NE 27-2n-103w, and Rooth 4, C NW NW 22-2n-103w. Well 3 is below 7034 feet and on drill-stem test at 6915-80 feet recovered 1250 feet of water in 3 hours. Weber in this well was topped at 6676 feet but sand characteristics had changed and no saturation was found in the top of the sand. Well 4 topped the Weber at 6915 feet and on best test made only 60 barrels of fluid per day with 40 percent water.

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THE OIL WEEKLY

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CALIFORNIA WILDCATS

Kern County—Failures: Gene Reid Exploration Co.'s Tejon 3, 25-32s-29e, Comanche Point area, Santa Margarita 924, Pulv. 1564, Granite 1662, Hart Granite 1815, abnd 1-23-47 at 1882.

Seaboard Oil Co.'s Seaboard-Richfield 76-36, 36-29s-29e, Ant Hill area, Olcese 3968, Pyramid Hills 5162, abnd 1-18-47 at 5306.

Kings County—Failure: Lebow and McNee's Hacienda 1, 11-24s-22e, Trico area, abnd 1-23-47 at 4460.

Tulare County—Failure: Superior's Huntley 1, 7-18s-24e, Goshen area, abnd 1-19-47 at 3811.

Orange County—Failure: Standard's Stanley Community 1, 33-4s-10w, Garden Grove area, abnd 1-20-47 at 8704.

FLORIDA WILDCAT

Monroe County—Failure: Gulf's State 1, lse 374, swc 15-67s-27e, comp 1-15-47 at 6100.

ILLINOIS WILDCATS

Clay County—Oil Discovery: Nat. Assoc. Pet. Co.'s Golden 1, sw ne sw 17-3n-6e, pump 87 bbls fr Benton, 2756-66 td 2772.

Cumberland County—Failure: K. R. Wilson's Hollensbe 1, 22-9n-10e, abnd 1300.

Edwards County—Failure: Ohio Oil Co.'s Waters 1, se se se 17-2s-10e, abnd 3420.

Franklin County—Oil Discovery: Sohio's Bosserman 1, ne se se 5-5s-3e, flow 117 bbls fr Aux Vases, 2834-41, td 2841.

Gallatin County—Failure: Delta Drlg. Co. et al's Chapman 1, se se sw 11-8s-8e, abnd 3015.

Gallatin County—Oil Discovery: Delta Drlg. Co. et al's Ingiston 1, se ne sw 34-8s-9e, pump 40 bbls for Pennsylvanian, 1564-80, td 1587.

Greene County—Failure: Fitzjarrald et al's Hammon 1, sw sw sw 4-11n-13w, abnd 750.

Hamilton County—Failure: Nat. Assoc. Pet. Co.'s Varney 1, se nw se 15-6s-7e, abnd 3473.

Jefferson County—Failure: Nat. Consumers Oil's Nowicki 1, se ne se 9-3s-1e, abnd 2128.

Marion County—Failure: George & Wrather's Warren 1, ne ne se 25-1n-4e, abnd 3910.

Wabash County—Failure: Fred Heldt's Walton 1, ne ne nw 22-1s-14w, abnd 3053.

Wabash County—Oil Discovery: F. J. Fleming et al's Berberich 1, se se nw 26-1s-14w, flow 250 bbls fr McCloskey, 2966-68, td 3016.

Washington County—Failure: Leo V. Horton's Huck 1, 16-1s-2w, abnd 2965.

White County—Failure: Nat. Assoc. Pet. Co.'s Healy 1, nw nw nw 34-6s-8e, abnd 3140.

INDIANA WILDCAT

Pike County—Failure: E. L. Shoudy's Thomas 1, nw ne se 8-1n-7w, abnd 1622.

KANSAS WILDCATS

Butler County—Failure: Hipple Estate et al's Janzen 1, sw sw ne 6-23s-3e, abnd 3280.

Gove County — Failure: Jones & Shelbourne et al's Hewitt 1, csw nw 15-13s-30w, abnd 4768.

Harvey County — Oil Discovery: Stanolind's Brandenberger 1, sw ne nw 12-24s-3w, pump 14 bbls fr Viola, 3878-90, td 4018.

Rice County — Oil Discovery: W. L. Hartman's Linke 1, ce¼ nw se 36-19s-10w, pump 75 bbls fr Arbuckle, 3273-75, td 3275.

Rice County — Failures: Keyes Drlg. Co.'s Hager 1, nw ne sw 17-19s-10w, abnd 3370.

Russell Maguire's Potwin 1, sw sw nw 9-20s-7w, abnd 3677.

Sedgwick County — Failure: Russell Maguire's Evans 1, ne ne sw 23-26s-1w, abnd 3617.

Woodson County — Failure: Kenneth Rupp's Lauber 1, sw nw ne 18-26s-15e, abnd 1414.

KENTUCKY WILDCATS

Henderson County—Failure: Carter Oil Co.'s Brook 1, 5-0-24, abnd 2657.

McLean County — Failure: H. H. Weinert's Breeden 2, 22-L-26, abnd 1615.

NORTH LOUISIANA WILDCATS

De Soto Parish — Kickapoo Oil Discovery: F. A. Callery's Bessie C. Strauss 1, 1980 fr wl 990 fr nl 19-14n-14w, 1 mi w Gloster, Massive Anhydrite 5030-5286, perf 48 shots 4070-78, pump 122⅛ bbls 43-gr oil, 35 bbls sw, comp 1-17-47 at 7085.

Franklin Parish — Failure: Murphy-Sun's Core Test 1, sw nw 26-16n-8e, 4 mi s of Delhi fld, abnd 1-15-47 at unknown total depth. Drilled tight.

Winn Parish — Failure: B. E. Reid's R. E. McCartney 1, 600 fr sl 1470 fr wl 23-10n-1w, abnd 1-10-47 at 1536.

NORTH LOUISIANA OUTPOST

Caddo Parish — Waskom (East Texas) Extension: Stanolind's Fred Wappler 1, c ne sw 20-17n-16w, base Annona 1645, Blossom 1955, Washita Fredricksburg 2360, Paluxy 2607, Perry Lke Anhydrite 4483-4736, Pettit 5633, Travis Peak 5887, dual comp: flow 10 min gas, 36/64-in, fr Pettit perf 5632-70, 5000 gals acid; perf Travis Peak 72 shots 60-68-76, flow 15 min gas, 36/64-in, shut in, comp 1-13-47 at 6218.

SOUTH LOUISIANA WILDCAT

Calcasieu Parish—Failure: Sun's Hunter Co. 3, 560 e 450 n of swc 23-9s-11w, abnd 1-20-47 at 9370.

SOUTH LOUISIANA NEW PAY TESTS

Calcasieu Parish — Bayou Choupique Gas-Distillate Discovery: Union Sulphur Co.'s J. G. Gray Est. 1, 1658.3 n 1648.6 w of sec 17-11s-10w, ¼ mi n Ellender 1 disc well, perf 16 shots 8612-16, flow 21.6 bbls 49-gr oil, 1,989,000 gas, 8/64-in, gor 92,000/1, comp 1-9-47 at 9500.

Calcasieu Parish — Lockport Oil Discovery: Magnolia's Freidberg & Wolf 7, fr nec sw¼ sec 9 29S s 33O w to lcn in 9-10s-9w, pay 7490, perf 24 shots 7490-94, f; pw 85 bbls 39.5-gr oil, 0.1% wtr, 9/64-in, gor 2341/1, comp 1-12-47 at 7700.

Iberville Parish — Laurel Ridge Gas-Distillate Discovery: Humble's Hibernia Bnk. & Tr. Co. 1, fr nwc sect 68 go 3700 sly alg wl th 400 ely at ra in 68-10s-14e, ¾ mi exten to prod, perf 60 shots 10,172-178, flow 89.38 bbls 61-gr, ⅛-in, gor 14-630/1, comp 1-12-47 at 10,660.

Jefferson Parish — Barataria Oil Discovery: Calif. Co.'s Rathborne Ld. Co. 1, 2-16s-23e, 5000 w of prod pay 8930, perf 48 shots 8938-39, flow 250 bbls 36.7-gr oil, 0.1% wtr, 9/64-in, gor 816/1, comp 1-16-47 at 10,700.

Plaquemines Parish — Lake Hermitage Gas-Distillate Discovery: Gulf's Lafourche Basin Levee Distr. 16, 1346.4 n alg wl sect 11 fr swc th 896.4 e at ra to lcn in 11-18s-25e, pay 11,975, perf 84 shots 12,022-36, flow 143.4 bbls 45.5-gr oil, 3,455,000 gas, 3/16-in, gor 24-722/1, comp 1-12-47 at 12,100.

NEW MEXICO WILDCAT

Roosevelt County—Failure: Continental Cooperative Refineries Assn.'s Alston-Federal Unit 1, c se se 20-7s-35e, elev 4236, andydrite 2030, San Andres 3505, abnd 1-16-47 at 5225.

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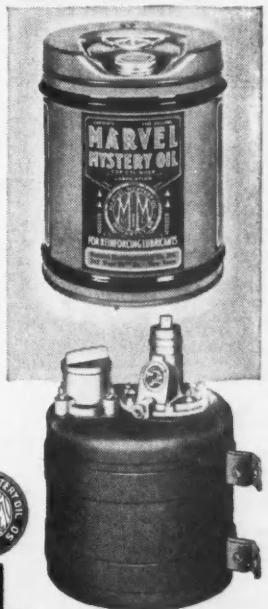

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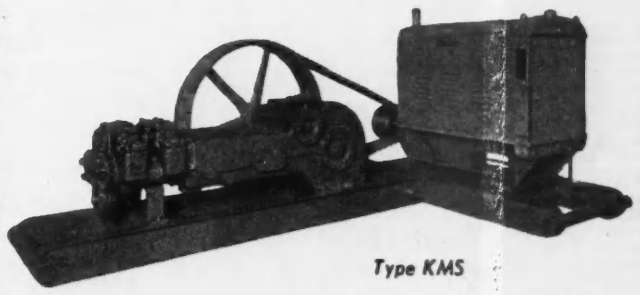

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OHIO WILDCATS

Lake County — Failure: Benedum-Trees' D. & G. Farinacci 1, Lot 12, Newburg 2995-3016, abnd 1-15-47 at 3221.

Muskingum County — Failure: Zanesville Tool and Supply Co.'s Smith Hrs. 1, 3rd Qr., Clinton 3331-79, abnd 1-17-47 at 3446.

WEST TEXAS WILDCATS

Scurry County — Failure: Humble Davis 1, c sw sw H&TC Ry. 339, blk 97, elev 2413, lime 1650, Mississippi 7780, Ellenburger 7926, abnd 1-21-47 at 8027.

Winkler County—Failures: Stanolind's Sealy-Smith 11, c sw sw 69, blk A, G&MMB&A sur, elec 2740, San Andres 3910, Glorietta 5110, abnd 1-20-47 at 6506.

Sunray Oil Corp.'s Sealy-Smith-Stanolind 1, c se se sec 31, blk A, G&MMB&A sur, elev 2841, anhydrite 990, San Andres 4000, Glorietta 5170, Clear Fork 5560, Wolfcamp 8030, Permian-Pennsylvanian contact 8200, Mississippian 9650, Woodford shale 10,340, abnd 1-23-47 at 10,889.

WEST TEXAS OUTPOST

Kent County—Polar Failure: Humble's Blair 1, c nw sw H&TC Ry. 44, blk 5, 1⅝ mi sw of Ellenburger disc, elev 2305, San Andres 1595, Clear Fork 2680, Wichita-Albany 3500, Mississippi 7609, Ellenburger 7805, abnd 1-20-47 at 7925.

WEST TEXAS NEW PAY TESTS

Andrews County — Block 12 Deep Oil Discovery: Atlantic's University-Texu 1-E, c ne ne sec 18, blk 12, ¾ mi w by n of 7100-ft Clear Fork prod, elev 3296, Glorietta 5533, Tubb 6515, base Permian 8125, Woodford 8165, Devonian 8450, pump 30 bbls 39.9-gr, gor 917/1, 7000 gals acid via 3 zones Devonian perf between 8454-8570 ft, comp 1-23-47 at 8817.

Ector County — Murchison Upper Oil Discovery: American Republics Corp.'s TXL 1, c sw se T&P Ry. 7, blk 45, T-2-S, ⅝ mi se of disc, elev 3053, Yates 2580, brown lime 3728, San Andres 4000, Glorietta 5060, Clear Fork 5450, Permian 7810, Woodford 8190, Devonian 8377, Silurian 9114, Fusselman 9482, Montoya 9593, Simpson 9810, McKee 10,210, Waddell 10,445, Joins 10,685, Ellenburger 10,716, pump 121 bbls 39.8-gr, gor 65/1, 11,000 gals acid via Wolfcamp perf 7795-7825, comp 1-20-47 at 10,736, pb 8000.

Gaines County—Cedar Lake Shallow Gas Discovery: B. H. Nolen and Byrom's Jones-Stanolind 1, c sw sw D&W Ry. 2, blk H, n edge of fld, elev 3146, anhydrite 2105, salt 2125, Yates 2926, 7,500,000 gas, natural, via 2-in, top pay and td 2926, comp 6-15-46.

WEST CENTRAL TEXAS WILDCATS

Callahan County — Failure: A. R. McElreath, Jr., et al's Eastham 1, 640 out swc nw S. P. Ry. 9, abnd 1-16-47 at 892.

Fisher County — Failure: H. F. Pettigrew et al's Herbst 1, 330 w 2600 n of nwc sect 35, but in HT&B Ry. 40, blk 1, abnd 1-23-47 at 4862.

Palo Pinto County — Failure: Fortex Oil Corp-Phoenix and Savage's Stuart 1, 1100 snl 660 ewl nw T&P Ry. 50, blk 4, abnd 1-21-47 at 1870.

Stonewall County — Failure: Standard of Kansas' McMeans 1, c ne se H&TC 172, blk D elev 1716, anhydrite 2060-2240, base Coleman Jt. 2650, Dothan 2828, base Saddle Creek 3110, Fluppen sand 3170-90, Bend 6026, Ellenburger 6325, abnd 1-22-47 at 6333.

NORTH TEXAS WILDCATS

Archer County—Failure: Fain-McGaha et al's M. Carson 1, 330 nsl 990 wel Robt Neil sur, KMA lime 4210, abnd 1-21-47 at 4510.

Jack County—Failure: A. R. Dillard et al's Marley 2, 990 snl 330 ewl e½ W. C. Ry. 2, elev 1231, abnd 1-1-47 at 3136.

Throckmorton County—Oil Discovery: Conrad Sztygold et al's Richardson 1, 1536 snl 1356 ewl sect 3083, TE&L Co. sur, 5½ mi nw prod, elev 1371, Bend 4535, Mississippi 5094, flow 115 bbls 40-gr oil, 2-in, 3-hr gge, shutin for pipe line, 1000 gals acid Bend perf 4640-50, comp 10-24-46 at 5151.

Throckmorton County—Failure: Acme Die & Machine Co.—S. D. Johnson's Davis-Shell 1, 1537 out swc sect 943, TE&L Co. sur, elev 1323, lime 4020, abnd 1-18-47 at 4124.

Young County—Failure: Wendell Drlg. Co's Davis 1, 1083 ewl 150 nsl sect 66, TE&L Co. sur, elev 1248, Gunsight 1031, abnd 1-15-47 at 1102.

SOUTH CENTRAL TEXAS WILDCAT

Caldwell County — Failure: W. Killam's Andrew J. Rodenberg 1, 570 fr sel 510 fr nel 100-ac lse, Guadalupe College sur, abnd 1-15-47 at 2322.

SOUTHWEST TEXAS WILDCATS

Duval County — Gas Discovery: Tom Graham-Cam Corp.'s Rosa V. Benavides 1, 330 fr nw&nel lot 3 sect 24, Cole Petr. sbdn Mariano Arispo Gr 75, 1293-ac lse, 2 mi ne Ohern fld, 1½ mi se Cole fld, pay 3320, perf 24 shots 3319-25, flow, 1,630,000 gas, open, tp 1180 lbs, comp 1-14-47 at 3333.

Starr County — Failure: W. D. Kennard et al's Starr Co. Cattle Co. 1, 330 fr n&wl 200-ac lse, 330 fr wl 1450 fr nl Porc 89, 1 mi ne Ross fld, 1½ mi w S. Ricon fld, abnd 1-15-47 at 2803.

Zapata County — Failure: Wm. H. Spice, Jr.'s, Albert Martin Tr. 2, 330 fr sel 990 fr swl blk 15, Fansler-O'Hern sbdn Carta Blanca Villa Gr, 2480.9-ac lse, 2⅝ mi se Colitas fld, 1½ mi s Villa fld, abnd 1-17-47 at 2164.

LOWER TEXAS COAST WILDCATS

Cameron County—Failure: Standard of Tex.-Shell's W. S. Parks 1, 4885 w of el sh 22 Petrero del Espiritu Santo Gr, 4885 fr el 2139 fr sl 5652-ac lse, 9 mi se Willamar fld, abnd 1-16-47 at 8836.

Live Oak County — Failure: Smith-Story-Wood Corp.'s E. W. McWhorter 1, 1428 fr nwl 180 fr nel Gal & Brazos Nav. Co. sur 2, 1428 fr nwl 330 fr nel 640-ac lse, abnd 1-14-47 at 4200.

LOWER TEXAS COAST NEW PAY TEST

Karnes County — Green Oil Discovery: Van Norman Oil Co.'s O. A. Mudd 1, 467 fr ne&nwl 800-ac lse, Carlos Martinez Gr, 1½ mi nw Burnell-Wilcox fld, Slick pay 6442, perf 6464-66, flow 111 bbls 35.3-gr, 5/32-in, gor 400/1, cp 1275 lbs, comp 12-22-46 at 6680.

Kleberg County — Borregas Oil Discovery: Humble's King Rch-Borregas 5, 2800 n of sl 24,350-ac lse and Sta. Gertrudis Gr, 5330 s th w at ra fr Borregas 2, se exten well, 1 mi ne Seeligson fld, perf 24 shots 6966 feet, flow 159.73 bbls 39-gr, ½-in, gor 896/1, tp 1800 lbs, comp 1-16-47 at 7800.

UPPER TEXAS COAST WILDCATS

Brazoria County — Failure: Humble's M. E. Belsey et al 1, 660 fr n&el sect 37 HT&B sur, 320-ac lse, 9 mi sw Alvin, abnd 1-19-47 at 9950.

Fayette County — Gas Discovery: Standard of Kansas' August Pietsch 1, 467 fr se&fiel 40-ac tr, J. R. Phillips Lge, 8 mi n LaGrange, Midway 6870, Wilcox pay 6520, perf 39 shots 6521-27, flow 2,900,000 dry gas, ¼-in, comp 1-18-47 at 6918.

Ft. Bend County — Failures: Atlas O&R Co.'s H. B. McCrary et al 1, 466 fr S&el 120.63-ac lse, 8395 fr nl 4495 fr el J. Knight and W. C. White sur, 4 mi sw Clodine fld, abnd 12-46 at 7625.

Martin Thompson's Mrs. Ethel M. Hand 1, start swc Robert Peebles sur go 525 w th 3191 n to lcn on 40-ac lse out of 553.5-ac tr, David H. Milburn sur, abnd 1-17-47 at 6516.

Harris County — Failure: Cockburn Oil Corp.-H. C. Cockburn's O. P. Woodburn 2, 6275 n of nearest prod at Friendswood and in Graben area, 467 fr n&wl 633-ac lse and August Whitlock sur, abnd 12-46 at 6518.

Madison County — Failure: Sun's J. A. Fannin 1, 2700 fr wl 330 fr nl 308.65-ac lse 330 fr nl T. Boatright sur, abnd 1-11-47 at 3065.

Wharton County — Failure: General Crude Oil Co. et al's R. A. Bassett 1, 990 fr nl 467 fr el 185.28-ac lse, Seth Ingram sur, blk 9, abnd 1-17-47 at 8502.

Wharton County — Oil Discovery: Gilcrease Oil Co.'s W. W. Duson 6, 330 fr n&wl 120-ac lse, I&GN sur, sect 23, 6200 w of Kubella prod, 1½ mi e of Hutchins oil prod, pay 4662, perf 18 shots 4663-66, flow 145 bbls 24.4-gr oil, 1% wtr, 10/64-in, gor 295/1, comp 1-5-47 at 4667.

WYOMING WILDCAT

Carbon County — Failure: Wasatch O&R's Gov't 1, se se nw 28-22n-88?, Seven Mile Area, Tensleep 2160, abnd 12-19-46 at 3257.

WYOMING OUTPOST

Fremont County — Gas Extension: Sand Draw Oil's Unit 1, ne sw ne 26-32n-95w, South Sand Draw, 1 mi fr prod, 1st Frontier 4015, 2nd Frontier 4105, 3rd Frontier 4301, 4th Frontier 4460, 5th Frontier 4555, comp (rig off), flow 20 mln gas, open, comp 12-20-46 at 4650.

More Time Is Asked for Synthetic Fuels Program

The $30 million five-year program for the development of synthetic fuels by the Bureau of Mines will cost $60 million and require eight years for completion, it is disclosed by Senator Joseph C. O'Mahoney of Wyoming in legislation which he has introduced to extend the period and increase the authorization.

Rising costs due to the war and the withdrawal by the War Department of the Missouri ordnance plant which it had agreed to turn over to the bureau were cited by O'Mahoney as reasons for the inability of the bureau to do the job as originally outlined.

AIME Meet

"The Effect of Completion Practices Upon Productivity Index and Recovery" will be discussed by Dr. Morris Johnston, General Petroleum Company, Los Angeles, at the February 4 meeting of the East Texas Section, AIME, to be held in the Kilgore Hotel, Kilgore.

"Best Bet Yet"

Here's a compact Sucker Rod Wiper designed as Well Pullers wanted it. Short overall height, 4", just right height for wrenching rods. Weight complete, only 29#. Easy to handle, comes mounted on pony rod ready to be used. Tough, natural rubber wiping webs squeegee rod, box and square free of oil. No oil leaves hole or flips on crew... Rubbers stand enough pressure to take oil to tank or sump if well flows. Wipes any size rod, ⅝" to 1¼".

Duo-Wipe style, code: SUBZONE, shown above, has two wiping elements. Quadra-Wipe Style, code: SUBSOLAR, has four rubbers for use with extra-low gravity oil. Both styles make up on standard tubing sizes at the well head.

Cut-away drawing shows sturdy construction. Handy Table Plate Head, available for both models, holds rod tools and elevators.

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SQUEAKS from the BULL WHEEL

Choosy

The elevator was tightly jammed when a girl said fiercely: "Take your hands off me, you louse! No, not you! YOU!"

Man Alive

"What did you do when her dress started coming off?"

"Why, I helped her out the best I could."

Double Indemnity

"Are all men fools?" she screamed at the climax of the domestic debate.

"No, my pet. Some men are bachelors."

A Fellow With Feeling

"I wouldn't have gone out with you if I'd known how young you are."

"What makes you think I'm so young?"

"You obviously have baby hands. They're beginning to creep."

Life Is Like That

A married couple were sleeping peacefully when the wife suddenly shouted out in her sleep: "Run! Here comes my husband!"

So hubby leaped up and dived through the window.

The Woman's Way

"Do you go with the girls?" asked the personnel man.

"No, sir," replied the applicant for a job.

"What! Do you mean to stand there and tell me you don't go with ANY girls?"

"That's right."

"Why?"

"My wife won't let me."

Fairway, Dull Day

"I hear you played golf with Joe. How was he in the rough?"

"I dunno. We played golf."

Secret Well Kept

"My husband is one man in a hundred."

"How do you keep him from finding out?"

The Better Life

"My love cannot be expressed in words."

"Wonderful! Tell me about it."

Ready-Made Alibi

"Pop, when you were a little boy like me did you go to Sunday School?"

"Sure, every Sunday."

"I'll bet it won't do me any good, either."

Finders Keepers

"Daughter, get off that sailor's lap!"

"But, Mother, I was here first!"

Hints for Householders

"As an act of friendship, darling, I must tell you that I saw Mabel lunching with your husband again."

"Sssh, not so loud! The maid will hear you. She's terribly jealous, you know."

Poet's Nook

You kissed and told
But that's all right;
The one you told
Called up last night!

Encore

You've wolfed and won,
Congratulations!
Now try to bear
Your wife's relations!

Encore Some More

She slaps you if you steal a kiss
She's angry if you don't.
Contrary Mary, modern Miss,
She wants to, but she won't.

She's a Lamb, Ewe Know

The pretty thing pranced into a dress shop and asked to see some silk dresses. Not having any the right size, the saleslady tried to interest her in some wool dresses, but it was no go. Finally, she asked: "But why do you insist on a silk dress?"

"Because I'm tired of having the wool pulled over my eyes."

Can't Take It With Him

"Mama, may I go into the water?"

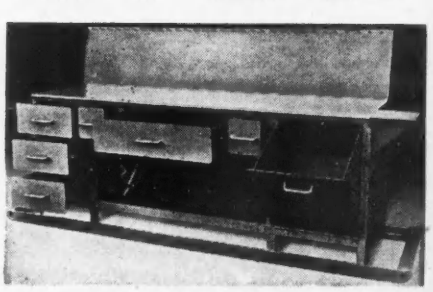
"No, dear."

"But Daddy's in there, and I can swim as good as he can."

"Yes, dear, but Daddy's insured."

OWEN

TYPE "A" WORK BENCH



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B. A. Otis, who has been with General Petroleum Corporation's land department since 1925, has been named assistant manager of that department. **Turner** torv foreman at Vernon and another 21-year veteran, has become chief structural engineer with headquarters at the Vernon, Calif., plant. **R. D. Fisher,** laboratory foreman at Vernon and another 21-year employe, has moved to Torrance as superintendent of laboratories. In the Rocky Mountain area, drill foreman **Dean Fox** has been named district supervisor of production with headquarters at Casper, Wyo.

J. S. Fluor, Jr., and **W. S. McAllister** have resigned from the board of directors of the California Natural Gasoline Association. Succeeding them are **W. Earl Dunn** of The Fluor Corporation and **E. W. Walker** of Western Gulf Oil Company.

Donald P. Jones, Swarthmore, Penn., has been elected assistant comptroller of Sun Oil Company, filling a vacancy that has existed since 1944, when **Robert G. Dunlop** was elected comptroller. Jones joined the auditing section of Sun's accounting department in 1932. During the war he handled the company's accounting contracts with various government agencies.

Peter P. Gregory, consulting petroleum engineer of Fort Worth, was commissioned to make an examination of an oil concession in the Upper Magdalena Valley of Colombia. He may also inspect some properties in Venezuela and Ecuador. He plans to be back in Texas within four or five weeks.

J. H. Hall, formerly superintendent of products pipe line department, Shell Oil Company, N. Y., has been appointed manager of the marketing engineering department. Hall started with Shell in 1932 as an electrical engineer and became chief engineer of the products pipe line department in 1938. In 1939 he was appointed superintendent of Shell's east line division, the position he held until his present appointment.

C. D. Cordry, Gulf Oil Corporation, was elected president of the Fort Worth Geological Society. **R. H. Schweers,** The Texas Company, and **Ray Dudley,** The Pure Oil Company, were chosen vice president and secretary-treasurer, respectively.

R. W. Pitcher, East Texas pipe line scout for Tide Water Associated Oil Company, has resigned to join Bay Petroleum Corporation, Denver, and will be crude solicitor for the firm's three refineries.

Charles R. Canfield has been promoted to Gulf Coast division geologist for Stanolind Oil & Gas Company at Houston. **C. L. (Swede) Larson,** former head of the Gulf Coast division, has been transferred to Casper, Wyo., to head the company's Rocky Mountains division. Canfield was formerly assistant geologist of the central division at Oklahoma City.

Dan Duncan has been named executive engineer for Emsco Derrick & Equipment Company, a position in which he will coordinate the firm's engineering activities. Duncan entered the oil business in 1921 as a roughneck for Shell Oil Company, in Ventura, Calif. After five years in Sumatra, he returned to the U. S. and was with The National Supply Company and Loffland Brothers before joining Emsco in 1939.

Dan Duncan

Dr. John H. Maxson, formerly assistant professor of geology at California Institute of Technology, Pasadena, has been employed as division geologist, Rocky Mountain Division, by The Bay Petroleum Corporation. Dr. Maxson recently reverted to inactive status as a lieutenant colonel, Officers Reserve Corps, after serving in the Intelligence Section of the Army Air Forces. **Harry B. Allen** has been named geologist in the Rocky Mountain Division by the firm. Allen was recently discharged from the Army Air Forces with the rank of lieutenant colonel, having commanded a B-29 reconnaissance squadron in the Pacific theater.

R. A. Bruce, Burmah Oil Company, is visiting in Houston and vicinity. Upon his return he will be placed in charge of exploratory drilling in India.

Hubert Guyod, Houston logging consultant, spoke before the Dallas Petroleum Engineers Club on "Interpretation of Electric Logs in Limestone."

Jed B. Maebius, geologist with Gulf Oil Corporation, has been transferred to Casper, Wyo.

C. A. (Mugs) Mulligan, pipe line specialist, has reentered pipe line work in Houston after an absence of several years. Mulligan was general superintendent on construction of the Iraq pipe line in the early 1930's. He formerly was with Humble Pipe Line Company, and his last connection before his retirement was with O. C. Whitaker Contracting Company.

Kirby L. Johnson of Houston and **Donald C. Larsen** of Eagle Lake, Texas, have incorporated the firm of L. & J. Geophysical Company, with headquarters at Houston.

W. E. Tracy, chief scout for The Ohio Oil Company in the Marshall, Ill., division, has been named to solicit purchase of crude for the company in Illinois and Indiana.

Bernard H. Lasky, engineer and geologist, has resumed consulting practice with the temporary headquarters at 3333 Charleston Circle, Houston.

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Lessen Boiler Deterioration
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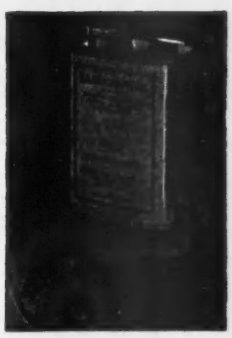

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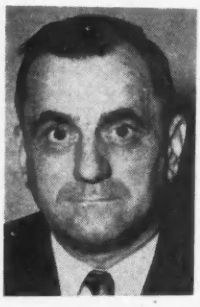
MEN IN THE INDUSTRY NEWS

Norris Green, Birmingham, Ala., has been named acting field manager of Thermoid's Oil Field Products Division. Named to replace **Paul Kelting,** who died in December, Green will have headquarters at Thermoid's Houston office at 1121 Rothwell Street. Prior to this appointment he had been district manager for Thermoid at Birmingham.



Norris Green

He was a lieutenant colonel in the Army during the last war.

»

Claude E. Donaldson, West Coast traffic manager of Shell Oil Company, retired February 1. Before joining Shell 30 years ago he worked 12 years with Great Northern and Southern Pacific railways. W. H. Adams, Donaldson's associate for 24 years, succeeds him.

»

W. M. Jones has been appointed manager of Texas operations for Gifford Oil Company, Tulsa firm recently given permit to operate in Texas. Jones has established headquarters at Monahans. **G. C. Parker,** Tulsa, is president of the firm.

»

Conrad Sztygold, Wichita Falls operator who opened an oil area in the Throckmorton County sector of Texas late last year, is president of Mayflower Properties, Inc., New York City firm that has been granted permit to operate in Texas. **Louis Chasswat** is secretary.

»

Hiram W. Schmidt, production superintendent and engineer for General American Oil Company, has been transferred from East Texas to the Post area in the Garza County sector of West Texas to operate the 27-well property recently acquired from the Lynn Oil Company for $540,000 cash.

»

John F. Black has been appointed general superintendent of the Buffalo, N. Y., plant of Wickwire Spencer Steel Division, The Colorado Fuel & Iron Corporation. Black entered the steel business at Bethlehem Steel Company's Sparrows Point plant, where he served more than 16 years. Before joining Wickwire Spencer, he was associated with Atlas Steels Limited as assistant works manager at Welland, Ont.

»

Fraser M. Moffat, Jr., has been named manager of the export department of the Calco Chemical Division, American Cyanamid Company.

»

Roe A. Gray has been appointed a training coordinator for Socony-Vacuum Oil Company in Venezuela. He recently was released from the armed services with a rank of lieutenant colonel and formerly was associated with General Petroleum Corp.

S. Riley Williams has been made vice president in charge of foreign business for Worthington Pump and Machinery Corporation. Williams joined Worthington in 1920 after his release from the Army, and from 1920 to 1941 served the firm in Europe. In 1941 he returned to the U. S. to become assistant to the vice president in charge of operations, and in 1945 he was appointed director of international business.

S. Riley Williams

»

James W. Heath of Henrietta has been appointed manager of Texas operations by the Exploration Service Company, which has headquarters at Bartlesville, Okla. **Vincent Miller** is president of the firm.

»

Leland Schenck of Blackwell and Sundae has been elected president of the Oilfields Service Association of Long Beach, Calif., succeeding **Oscar Shehorn** of Oil Tool Corporation. **M. A. Buchanan** was named vice president, succeeding **E. N. Palsgrove. J. P. Butler** was reelected secretary.

»

A. J. Adams has been appointed personnel director for Houston Oil Field Material Company, Houston. Adams joined HOMCO in 1937 as warehouseman and was later transferred into the general office, then to the industrial sales department. After his separation from the Army, which he entered in 1942, he returned to HOMCO on June 20, 1946, as assistant personnel director. In his new position he succeeds **H. P. Edmundson,** transferred to the sales department.

Deaths

Sir John Smith Flett, 77, British geologist, died in London January 28. He was director of geological survey of Great Britain and the Museum of Practical Geology from 1920 until his retirement in 1935 and was the author of many articles on geological survey.

»

Patrick A. Hardman, 84, retired drilling contractor, died in Tulsa January 24. A native of Elmira, N. Y., Hardman moved to Oklahoma in 1909, where he became active in the oil industry. He retired 20 years ago.

»

E. Goff, retired employe of The Texas Company, Houma, La., District, died in Wichita Falls November 24.

»

Dean Edward Ketron, 33, Vinita, Okla., oil field worker, was killed January 21 while at work.

S. P. Wallace Named President, Treasurer of Maloney-Crawford

S. P. Wallace, former Parkersburg Rig and Reel executive and for the past year vice president and sales manager of the Maloney - Crawford Tank & Manufacturing Company of Tulsa, has been elected president and treasurer of Maloney-Crawford.

S. P. Wallace

Announcement of Wallace's election was made by the board of directors, consisting of O. W. Maloney, vice president; J. C. Highfill, vice president; Lawrence E. Davis; Joseph M. Handlan, and Wallace.

With its plant capacity doubled during the war period, the firm has the largest sales and service force in its history, Wallace reported. Increased manufacturing facilities include those for bolted and welded steel tanks, high and low pressure oil and gas separators, and heat treating units.

Assistants to General Manager Of Baroid Sales Are Appointed

W. L. Heater, D. S. Sikes and H. H. Farnham have been appointed assistants to the general manager of Baroid Sales Division, National Lead Company, with headquarters in the Los Angeles office.

The following appointments likewise have been made: L. W. Huebel, manager, Gulf Coast Division at Houston; E. W. Louden, field service manager at Houston; Fred B. Williams, manager, Pacific Coast Division at Los Angeles; N. B. Thompson, assistant manager, Pacific Coast Division; A. C. Cramer, assistant manager, Gulf Coast Division; J. H. Beesley, sales manager, Mid-Continent Division at Tulsa; Dixon D. Powers, distribution supervisor, Gulf Coast Division; K. K. Litman, Dallas sales representative, Dallas.

Together with J. W. Hofstetter, assistant to the general manager and comptroller, Heater, Sikes and Farnham will supervise, under the direction of General Manager G. L. Ratcliffe, all activities of the division. W. L. Heater will have charge of purchases, non-drilling mud sales, and advertising. D. A. Sikes will have charge of drilling mud sales and field service. H. H. Farnham will have charge of research and development, testing equipment, and well logging.

Bakersfield Store Is Opened by Production Equipment Company

Production Equipment Company, Inc., subsidiary of The Buda Company, has opened a store at 308 North Chester Avenue, Bakersfield, Calif., which offers complete services on the company's engines and gaso-power pumps, and carries replacement parts, V-belt drives, accessory equipment.

Walter G. Swaney Becomes Head of Kerotest Manufacturing Company

Walter G. Swaney was elected president of Kerotest Manufacturing Company, Pittsburgh, and Stanley J. Roush was named executive vice president by the board of directors January 23. Edward G. Mueller, former president, became chairman of the board. Other officers elected included: A. W. Anderson, works manager and director of purchases, and Ralph E. Lane, secretary-treasurer.

Walter G. Swaney

Swaney was one of the original members of the firm, having started as a clerk in 1905. One of the company's first major contributions to the oil industry was the production of the first cast steel gate valve adopted in the oil fields. The change to cast steel was developed to enable drillers to eliminate the huge cast iron valves whose immense weight and bulk could be replaced by the streamlined cast steel valve.

Allis-Chalmers Groups Districts, Names Three Regional Managers

District offices of Allis-Chalmers Manufacting Company will be grouped according to location and similar interests under the direction of regional managers, it was announced by W. C. Johnson, vice president in charge of the general machinery division, at a conference of district office managers and company executives in Milwaukee, Wis.

The regional managers will each have a staff of specialists, and the regions will operate as self-contained field units.

Johnson announced the appointment of the first regional managers who will be a nucleus for building the first four regional organizations. They are W. F. Taylor, D. S. Kerr and J. L. Pratt, as well as A. J. Schmitz, who will continue in that capacity. Taylor will supervise the New England area, Pratt the Southwest, Kerr the Southeast, and Schmitz will continue to direct operations on the Pacific Coast.

Rocky Mountain and West Texas Appointments Made by Oil Base

Oil Base, Inc., Los Angeles, manufacturers of Black Magic oil base drilling muds, announced appointment of Arthur K. Brown to the Rocky Mountain area sales staff, with headquarters in Vernal, Utah. Brown was formerly with Shell Oil Company, U. S. Bureau of Mines, and Baroid Sales Division.

Ralph Ruse has been transferred from the Rocky Mountain area and placed in charge of the West Texas area with headquarters at Odessa, Texas. Ruse has been with Oil Base, Inc., since the company's origin.

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TRADING POST SECTION

ON PAGE 58 OF THIS ISSUE

Goodyear Increases Los Angeles Manufacturing Equipment

Expansion of Goodyear Tire & Rubber Company's manufacturing facilities for mechanical and molded goods products was announced by Frank A. Steele, plant manager of the Los Angeles Goodyear factory.

Equipment is to be installed for production of automobile floor mats, and that several thousand small-type tires for toys, lawnmowers and industrial vehicles will be produced.

At the same time, appointment of Ben Lee Mattingly to fill a new Goodyear post as manager of molded goods sales, Los Angeles, was announced by W. C. Winings, manager of the company's Mechanical Goods Division, Akron, Ohio.

Principal mechanical and molded goods items already produced in Los Angeles by Goodyear are tank car lining and hand-built industrial hose for mining, oil and construction operations.

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